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OF
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DEPARTMENT OF AGRICULTURE

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VOLUME XXXIII.

INDEX

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Vol. XXXIII.

SAORSTÁT ÉIREANN.

DEPARTMENT OF AGRICULTURE

JOURNAL

Grass Silage—The Selection of Irish Free State Creamery Butter for Cold Storage—National Ploughing Championships—Field Experiments, 1933—Development of an Improved Type of Winter Spray for Orchards—Seventh International Seed Testing Congress, July, 1934—History of Potato Varieties—Report of the Seed Propagation Division, 1933—Potatoes *versus* Swedes in the Ration of Dairy Cows—Final Fruit Crop Report, 1933—Sugar Pulp for Dairy Cows—Notes and Memoranda.

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CONTENTS.

	PAGE
Grass Silage. By Professor J. P. Drew, M.Sc., A.R.C.Sc.I.; G. F. O'Sullivan, M.Sc., and D. Deasy, B.Agr.Sc., University College, Dublin	1
The Selection of Irish Free State Creamery Butter for Cold Storage. By G. Van B. Gilmour, Ph.D. (Lond.), F.I.C., and Paul S. Arup, Ph.D. (Lond.), F.I.C.	23
National Ploughing Championships 17291	29
Field Experiments, 1933 IARI	33
Development of an Improved Type of Winter Spray for Orchards. By J. Carroll, M.Sc., D.I.C., A.R.C.Sc.I., N.D.A., and E. McMahon, M.Sc., B.Agr.Sc., Department of Agricultural Zoology, University College, Dublin	48
Seventh International Seed Testing Congress, July, 1934. Report by H. A. Lafferty, F.R.C.Sc.I., Director, Seed Testing Station, Dublin	53
History of Potato Varieties. By W. D. Davidson, B.A., B.Sc. ...	57
Report of the Seed Propagation Division, 1933	82
Potatoes <i>versus</i> Swedes in the Ration of Dairy Cows. Experiment conducted by P. Conroy, B.Agr.Sc., N.D.A., Instructor in Agriculture, Co. Westmeath	101
Final Fruit Crop Reports, 1933	106
Sugar Pulp for Dairy Cows	114
Notes and Memoranda	138

The Sugar Beet of the Future—A.I.V. Silage; Tests at Rothamstead—Decline of the Poultry Industry in South Africa—Relative Feeding-Value of Potato Flakes and Slices—The Colorado Beetle in France—Colorado Beetle Menace: Swiss Regulations—Effect of Feeding Stuffs on Quality of Eggs—Consumption of Margarine in Holland—Destruction of Weeds in Cereal Crops by means of Sulphuric Acid Spraying—Pig-Recording in Sweden, 1932—Regulation of Pig Supplies in U.S.A.—Co-operative Egg Trade in Germany—Abattoir Loan Fund in Sweden—Danish Agricultural Crisis—Colorado Beetle in British Columbia—Export Bounties in Finland—Department's Exhibit at Royal Horticultural Society Show.

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CONTENTS.

	PAGE
Experiments on Grass Silage. By C. Boyle, M.A., Ph.D., and J. J. Ryan, M.Sc., A.R.C.Sc.I., University College, Cork ...	149
Louping-ill. By J. H. N. ...	160
Field Beans. By J. J. Hassett, A.R.C.Sc.I., Superintendent, Agri- cultural School, Clonakilty ...	163
The Food Value of Oat Hulls. By E. J. Sheehy, F.R.C.Sc.I., B.Sc., University College, Dublin ...	167
Botanic Gardens: Origin, History and Development. By J. W. Besant, A.H.R.H.S., Keeper of the Botanic Gardens ...	173
Land Reclamation in the Congested Districts. By John Kelly ...	183
The Muskrat in Saorstát Éireann. By Thomas Garvey ...	189
Field Experiments, 1934 ...	196
Crown Rot in Sugar Beet ...	207
Cultivation of Tomatoes ...	211
National Egg-Laying Competition, 1933-34 ...	221
Notes and Memoranda ... <i>Regulating the Dairy Industry in Australia—Milk Recording in Sweden, 1932-33</i>	283
Official Document ...	285

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|---------------------------------------------------------------|----------------------------------------------------------------------------------------------|
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 „ 42. The Laying Down of Land to Hay and Pasture.
 „ 43. The Hatching and Rearing of Chickens.
 „ 44. "Husk" or "Hoose" in Calves.
 „ 45. Ringworm on Cattle.
 „ 46. Defects in Hay-making.
 „ 47. Black Currant Mite.
 „ 48. Foul Brood or Bee Pest.
 „ 49. Poultry Fattening.
 „ 50. Portable Poultry Houses.
 „ 51. Leather-Jacket Grubs.
 „ 52. Marketing Honey.
 „ 53. The Construction of a Cow House.
 „ 54. Breeding and Feeding Cattle for Early Beef.
 „ 55. The Apple.
 „ 56. Cultivation of the Root Crop.</p> | <p>No. 57. The Packing and Grading of Apples and Pears for Market.
 „ 58. Sprouting Seed Potatoes.
 „ 59. The Testing of Farm Seeds.
 „ 60. The Care and Marketing of Wool.
 „ 61. Wheat Growing.
 „ 62. The Management and Feeding of Dairy Cows.
 „ 63. "Redwater" or "Blood-Murrain" in Cattle.
 „ 64. Varieties of Fruit Suitable for Cultivation in Ireland.
 „ 65. Forestry: The Planting of Waste Lands.
 „ 66. Forestry: The Proper Method of Planting Forest Trees.
 „ 67. Trees for Poles and Timber.
 „ 68. Trees for Shelter and Ornament.
 „ 69. Tuberculosis in Cattle.
 „ 70. Forestry: Planting, Management and Preservation of Shelter-Belts and Hedge-row Timber.
 „ 71. Some Fungus Diseases of Root Crops.
 „ 72. Cheese-Making on the Farm.
 „ 73. The Planting and Management of Farm Hedges.
 „ 74. Some Common Skin Parasites of Sheep.
 „ 75. The Warble Fly.
 „ 76. Some Fungus Diseases of Bush Fruits.
 „ 77. Scour and Wasting in Young Cattle.
 „ 78. Home Butter-making.
 „ 79. The Cultivation of Small Fruits.
 „ 80. Catch Crops.
 „ 81. Potato Culture on Small Farms.
 „ 82. Cultivation of Maincrop Potatoes.
 „ 83. The Cultivation of Osiers.
 „ 84. Some Fungus Diseases of Fruit Trees.
 „ 85. Some Injurious Orchard Insects.
 „ 86. The Production of Clean Milk.
 „ 87. Barley Growing.
 „ 88. Home Preservation of Fruit.
 „ 89. The Construction of Piggeries.
 „ 90. Advantages of Early Ploughing
 „ 91. Wart Disease or Black Scab of Potatoes.
 „ 92. Home Preservation of Eggs.
 „ 93. Marketing Wild Fruits.
 „ 94. Rabbit Culture for Food, Wool, and Fur.
 „ 95. Basic Slag and other Phosphatic Manures.
 „ 96. Packing Eggs for Hatching.
 „ 97. Weeds.
 „ 98. Tuberculosis in Poultry.
 „ 99. Seaweed as Manure.
 „ 100. Marketing of Soft Fruits.
 „ 101. Diseases and Pests of Vegetable Crops.
 „ 102. The Use of Home-Grown Grain in the Feeding of Farm Animals.
 „ 103. Braxy in Sheep.
 „ 104. Method of Milk-Recording.
 „ 105. Grass Ensilage.
 „ 106. The Colorado Beetle.
 „ 107. Milk Fever and Mammitis in Cattle.</p> |
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Copies of the above leaflets can be obtained free of charge, and post free, on application to the Secretary, Department of Agriculture, Dublin, C.17. Letters of application so addressed need not be stamped. Envelopes should be marked "Publication."

EXPERIMENTAL DATA.

Weight of grass ensiled	..	..	..	15.71 tons
Total weight of silage produced	..	..	..	13.75 ..
Loss in weight by ensiling	..	..	..	12.47%
Weight of edible silage produced	..	..	..	12.92 tons.
Loss due to spoilage by moulds	..	..	..	6.04%
Weight of dry matter in grass ensiled	..	..	..	3.70 tons.
Weight of dry matter in silage produced	..	..	..	3.06 ..
Loss in dry matter	..	..	..	17.30%
Weight of dry matter in non-edible silage	..	..	..	0.19 tons.
Total dry matter loss	..	..	..	22.48%
True protein broken down into simpler compounds				
by ensiling	..	..	..	39.13%
Acidity of silage	..	..	..	pH 3.97 to pH 4.51.

SUMMARY OF RESULTS.

An examination of the foregoing results will show that, as in the previous experiments, the addition of acid to the grass at the time of ensiling brought about a reduction in the dry matter loss. Under the new method of sampling it was possible to determine the amount of dry matter removed from the silos as non-edible material. When this is taken into consideration, there is no significant difference in the total dry matter losses incurred by the natural fermentation and A.I.V. methods.

Further, the extent of true protein degradation was again appreciably reduced by acid addition. It should be pointed out, however, that even though this was the case there was but little difference between the actual percentages of true protein in the dry matter of the two types of silage, the figures being 5.94 per cent. for the natural fermentation material, and 7.55 per cent. for the A.I.V.

In view of the fact that the amount of edible dry matter produced was approximately the same in both cases, being 77.6 per cent. and 80.6 per cent. respectively of the total dry matter ensiled, it is very doubtful whether the reduction in true protein degradation would compensate for the extra expenditure, labour and delay involved in the ensiling of grass by the acid treatment.

FEEDING TRIALS.

In order to obtain some information on the feeding value of the different types of silage produced, it was arranged to carry out feeding trials with dairy cows.

In the examination and interpretation of the results obtained from these trials particular attention is directed to the dry matter contents of the different types of silage. As the grass used in the filling of each silo differed in dry matter content, so also did the resulting silage. In view of this fact, it is necessary to compare the results obtained on a dry matter basis.

SEMI-MATURE GRASS SILAGE.

The feeding value of silage produced from semi-mature grass by natural fermentation was compared with that produced by the Defu and the A.I.V. methods.

It was arranged to carry out this trial on the change-over of ration system which necessitated having four comparable groups of animals. Accordingly, sixteen commercial shorthorn cows were selected from the College herd, and divided into four groups with due regard to age, date of calving, average daily milk yield, quality and liveweight of each animal. They were then fed as follows :—

- Period I.*—Group 1. Natural Fermentation silage + hay + meals.
 „ 2. A.I.V. silage + hay + meals.
 „ 3. Natural Fermentation silage + hay + meals.
 „ 4. Defu silage + hay + meals.

In order that too complicated a ration would not interfere with the interpretation of the results, the silage in each ration constituted the greater proportion of the foods fed. It was given *ad lib.* the amount consumed daily by each animal being recorded. The dry matter content of the silage being known, it was possible to record also the quantity of dry matter consumed.

A fixed quantity of hay was given to each animal, and the meals were fed according to the milk yields. In the feeding of silage made by the acid treatments, particularly A.I.V. silage, the inclusion of a mineral mixture has been recommended. Accordingly, a mixture made up of three parts of Ground Limestone and one part of Sodium Carbonate was included in the silage fed to each group at the rate of three ounces to sixty pounds of silage.

During the first week of the trial, it was observed that the animals on the natural fermentation silage showed a dislike to the minerals mixed with it, and it was, therefore, decided to include the minerals instead in the meal mixture. This had the desired effect, the animals eating the silage readily and not showing any dislike to the minerals incorporated in the meals.

As the experiment progressed, it was seen that spoilage due to moulds was much greater in the case of the acid treated silage than had been anticipated, and accordingly, that the quantity of edible material would not permit the carrying out of the experiment on the original lines. It was decided, therefore, to continue feeding the animals as outlined above until all the Defu and A.I.V. silage was consumed. There proved to be sufficient material available for a period of a little over three weeks. The cows in Groups 2 and 4 were then changed over to natural fermentation silage for a period of four weeks, the first of which was regarded as a transition period to enable them to become accustomed to the different silage. Groups 1 and 3, which it had been intended to transfer to acid silage, had to be continued on the natural fermentation silage and regarded as control animals

Though the circumstances did not permit the carrying of the feeding trials according to the original scheme, the results recorded, in view of their uniformity, are useful for comparison purposes.

The average daily rations fed to each group during Periods I. and II. are set out on Table III. following.

TABLE III.
AVERAGE DAILY RATIONS.

PERIOD I.				
GROUP I.	..	<i>Natural Fermentation Silage.</i> 44 lb. (D.M. 9.81 lb.)	<i>Hay.</i> 6 lb.	<i>Meals.†</i> *8 lb.
GROUP II.	..	<i>A.I.V. Treatment Silage.</i> *42 lb. (D.M. 11.94 lb.)	6 lb.	8 lb.
GROUP III.	..	<i>Natural Fermentation Silage.</i> 41 lb. (D.M. 9.14 lb.)	6 lb.	*7.5 lb.
GROUP IV.	..	<i>Defu Treatment Silage.</i> *44 lb. (D.M. 10.96 lb.)	6 lb.	7.5 lb.
PERIOD II.				
GROUP I.	..	<i>Natural Fermentation Silage.</i> 48 lb. (D.M. 10.70 lb.)	<i>Hay.</i> 6 lb.	<i>Meals.†</i> *7.5 lb.
GROUP II.	..	<i>Natural Fermentation Silage.</i> 47 lb. (D.M. 10.48 lb.)	6 lb.	*8 lb.
GROUP III.	..	<i>Natural Fermentation Silage.</i> 45 lb. (D.M. 10.03 lb.)	6 lb.	*6.5 lb.
GROUP IV.	..	<i>Natural Fermentation Silage.</i> 48 lb. (D.M. 10.70 lb.)	6 lb.	*6.5 lb.

* Minerals added.

†Meals—mixture of 4 parts Rolled Oats, 1 part Bran and 2 parts Decorticated Cotton Cake.

On examination of the foregoing figures, it will be seen that during Period I., the average daily silage consumption, and therefore the dry matter consumed, varied for each group, but that the animals on the A.I.V. and Defu silage consumed a greater quantity of dry matter than those in either

of the other two groups. During the second period, however, although there was a slight difference between the quantities of silage eaten by each group, there was practically no difference in the amounts of dry matter consumed.

From observations made during the progress of the trials, it would appear that the A.I.V. silage was not as palatable as the other two types.

The milk from each cow was recorded daily. With the exception of two cows, one in Group 2 and one in Group 3, the animals maintained a normal healthy appearance throughout the trial. The cow referred to in Group 2 got mastitis but responded to treatment, and was again feeding normally at the end of four days. The cow in Group 3 got a scour which was, however, of short duration. In both cases the daily milk yields were reduced, and on recovery the animals, particularly the one in Group 2, did not come back to their former level of productivity. In view of these facts, the daily milk yields expressed as averages for the two groups in question were adversely affected, and on this account it was decided to show figures for the individual cows in each group.

The daily milk yields for the individual cows in each group are shown on Table IV. and the average for each group is illustrated on diagram A.

On examination of the foregoing figures and diagram it will be seen that there is no significant difference in the milk yields from each group, which indicates that the natural fermentation, Defu and A.I.V. silages are of about equal feeding value for dairy cows.

AFTERMATH GRASS SILAGE.

The feeding value of silage produced from aftermath grass by natural fermentation was compared with that produced by the Defu and A.I.V. methods.

As the animals used in the previous experiment were well accustomed to silage it was decided to utilize them for these trials. Accordingly, fifteen of them were selected and divided into three comparable groups, the experiment being carried out on the change-over of ration system. They were fed as follows :—

- Period I.*—Group 1. Natural fermentation silage + hay + meals
 „ 2. A.I.V. silage + hay + meals.
 „ 3. Defu silage + hay + meals.

- Period II.*—Group 1. A.I.V. silage + hay + meals.
 „ 2. Natural fermentation silage + hay + meals.
 „ 3. Natural fermentation silage + hay + meals.

Each period was of three weeks' duration with a transition period of one week at the change over to allow the animals to become accustomed to the different silage. It would have been preferred to have longer experimental periods, but the supply of acid treatment silage was limited.

As in the previous experiment, the silage was fed *ad lib.* to each animal, the hay in a fixed quantity and the meals according to the milk yields. The average daily rations fed during Periods I and II were as follows:—

TABLE V.
AVERAGE DAILY RATIONS.

PERIOD I.				
GROUP I.	..	<i>Natural Fermentation Silage.</i> 54 lb. (D.M. 9.91 lb.)	<i>Hay.</i> 6 lb.	<i>Meals.†</i> *6.5 lb.
Group II.	..	<i>A.I.V. Treatment Silage.</i> *32 lb. (D.M. 9.18 lb.)	6 lb.	5.25 lb.
GROUP III.	..	<i>Defu Treatment Silage.</i> *53 lb. (D.M. 11.62 lb.)	6 lb.	6.5 lb.
PERIOD II.				
GROUP I.	..	<i>A.I.V. Treatment Silage.</i> *35 lb. (D.M. 10.04 lb.)	<i>Hay.</i> 6 lb.	<i>Meals.†</i> 6 lb.
GROUP II.	..	<i>Natural Fermentation Silage.</i> 47 lb. (D.M. 8.50 lb.)	6 lb.	*4 lb.
GROUP III.	..	<i>Natural Fermentation Silage.</i> 54 lb. (D.M. 9.67 lb.)	6 lb.	*5 lb.

*Minerals added.

†Meals—mixture of 2 parts Rolled Oats, 1 part Maize Meal, 1 part Bran, and 2 parts Decorticated Cotton Cake.

On examination of the foregoing figures it will be seen that during Period I the animals in Groups 1 and 3 consumed daily more silage than those in Group 2; the animals in Groups 1 and 2 consumed approximately equal quantities of dry matter, while the daily consumption of Group 3 was slightly higher.

Although the amount of silage consumed by the animals in each group again differed during Period II, the dry matter consumption was practically the same.

The daily milk yields for the individual cows in each group are shown on Table VI. and the average daily milk yield for each group is illustrated in diagram B.

The figures and diagram show that, as in the previous experiment, there was no significant difference in the results obtained, thus indicating that silage produced from aftermath grass by the natural fermentation, Defu and A.I.V. methods is of about equal feeding value for dairy cows.

PERIOD I.—NATURAL FERMENTATION.

Days	No. of	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	Cow																					
Group I.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	
	102	24	24	24	23	23	23	26	22	26	24	24	23	24	24	23	24	23	23	21	21	
	100	33	33	33	31	33	34	35	35	35	36	35	33	31	30	31	31	32	32	31	31	
	111	34	37	34	32	35	36	34	35	33	36	35	35	35	34	33	32	34	36	34	34	
	112	31	30	31	28	32	30		30	30	29	29	30	28	20	29	28	28	29	29	27	
Av.	30.50	30.00	30.00	28.50	30.75	30.75	31.25	30.50	31.00	31.25	30.75	30.25	29.50	29.25	29.00	28.75	29.25	30.00	28.75	28.75	28.75	

PERIOD I.—A.I.V.

Group II.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.
	110	33	38	32	31	34	32	33	32	31	31	31	30	30	30	29	30	31	31	32	29
	107	27	28	28	26	28	27	27	27	29	29	26	26	27	27	26	26	27	27	27	27
	180	34	33	32	34	33	34	33	33	32	33	31	32	33	30	31	29	31	28	30	31
Group II.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.
	113	39	41	39	39	42	40	40	29*	21*	26*	28*	30	31	33	35	36	34	35	37	37
	Av.	38.25	38.75	38.75	32.50	34.25	33.25	33.25	30.25	28.25	29.75	29.25	29.50	30.00	30.00	30.50	30.25	30.50	30.25	31.25	31.75

PERIOD I.—NATURAL FERMENTATION.

Group III.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.
	104	29	27	25	26	26	25	24	25	26	24	24	23	24	23	23	23	24	23	24	24
	116	31	29	27	26	26	26	24	23	28	23	24	25	25	25	24	24	24	23	24	24
	117	33	33	32	32	33	32	33	32	30	32	30	32	32	32	34	32	32	34	38	34
Group III.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.
	91	27	28	30	27	26	26	23	26	26	22	22	23	25	22	25	24	24	24	23	22
	Av.	30.00	29.25	28.50	27.75	27.75	27.25	26.00	26.50	27.25	25.00	25.00	25.50	26.50	26.25	26.00	26.00	26.25	26.00	26.00	26.25

PERIOD I.—DEPT.

Group IV.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.
	100	24	24	23	22	22	22	23	22	21	22	21	22	22	22	21	22	22	23	23	22
	114	34	31	32	29	30	31	31	29	27	26	28	27	29	28	28	25	28	29	30	29
	115	34	32	31	29	31	28	33	28	26	29	29	26	28	27	31	31	29	31	32	32
Group IV.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.	Ib.
	68	36	38	31	34	36	35	34	34	31	32	30	31	30	31	32	31	32	32	34	33
	Av.	32.00	31.25	30.25	28.50	29.75	29.00	30.25	28.25	28.25	27.25	27.00	26.50	27.25	27.25	27.00	28.00	27.75	28.75	29.75	28.25

*Cow suffering from mastitis.

TRANSITION PERIOD
SEVEN DAYS

TABLE IV.

Daily milk yield for Individual Cows in each Group.

PERIOD 2—NATURAL FERMENTATION.																				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
23	21	23	23	22	23	23	23	24	23	23	22	22	22	21	21	21	20	20	21	22
33	32	32	36	35	33	37	35	35	35	33	32	34	33	34	34	33	34	33	32	31
32	29	31	31	30	30	30	32	32	33	32	32	31	30	32	32	32	32	32	31	31
29	29	33	30	29	30	30	29	30	30	28	28	28	28	29	29	29	31	28	29	28
29.25	27.75	29.75	30.00	29.00	29.00	30.00	29.75	30.25	30.25	29.00	28.50	28.75	28.25	29.00	29.00	28.75	29.25	28.25	28.25	28.00
PERIOD 2.—NATURAL FERMENTATION.																				
30	31	31	34	31	32	33	32	33	31	31	30	31	31	31	31	33	32	33	33	32
26	27	27	27	29	26	27	26	26	26	27	24	26	24	26	25	25	24	24	23	21
32	28	33	32	31	32	34	33	32	32	32	31	32	32	31	33	33	33	32	33	33
36	34	35	34	36	36	36	36	36	36	35	36	34	34	34	34	35	34	33	35	33
31.00	30.00	31.50	31.75	31.75	31.50	32.50	31.75	31.75	31.25	31.25	30.25	30.75	30.25	30.50	30.75	31.50	30.75	30.50	31.00	30.00
PERIOD 2.—NATURAL FERMENTATION.																				
23	22	25	25	25	26	25	24	24	25	24	20	17†	17†	19†	22	21	23	21	23	22
25	25	25	27	24	25	24	25	23	24	22	23	22	22	23	23	21	22	24	24	23
35	37	35	35	36	36	36	35	33	33	33	33	34	34	34	33	33	34	33	33	33
22	23	23	22	23	25	25	25	24	23	23	24	24	25	23	24	22	23	23	24	23
26.25	26.75	27.00	27.25	27.00	28.00	27.50	27.25	26.00	26.25	25.50	25.00	24.25	24.50	24.75	25.50	24.25	25.50	25.25	26.00	25.25
PERIOD 2.—NATURAL FERMENTATION.																				
19	22	21	21	21	21	21	21	20	14	26	21	20	20	21	20	20	22	18	20	19
23	26	24	25	24	26	26	26	23	24	23	22	24	25	24	24	23	23	22	23	23
29	29	29	29	29	31	28	30	29	30	30	30	30	29	31	29	31	29	31	27	31
30	31	33	32	32	29	33	32	32	31	32	33	31	31	31	32	31	32	29	29	30
25.25	27.00	26.75	26.75	26.50	26.75	27.00	27.25	26.00	24.75	27.75	26.50	26.25	26.25	26.75	26.25	26.25	26.50	25.00	24.75	25.75

†Cow suffering from scour

TABLE VI.

Daily milk yields for Individual Cows in each Group.

TRANSITION PERIOD
SEVEN DAYS

PERIOD 1.—NATURAL FERMENTATION.

Days	No. of Cows	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
		lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
	113	32	34	34	34	36	34	35	36	34	36	35	35	35	33	32	36	36	35	36	38	37
	112	26	27	28	26	29	29	26	27	28	26	28	28	30	28	28	27	31	27	30	29	26
GROUP I.	108	28	30	31	31	32	28	30	28	29	31	34	34	33	37	33	34	38	32	32	33	36
	107	24	25	24	22	23	24	25	23	25	25	25	25	26	26	24	25	24	26	25	23	23
	91	24	22	24	25	22	22	19	24	24	24	26	24	25	24	24	25	23	24	24	25	24
	Av.	26.8	27.6	28.2	27.8	28.4	27.4	27.0	27.6	28.0	28.4	29.6	29.2	29.8	29.6	28.2	29.4	30.4	28.8	29.4	29.6	29.2

PERIOD 1.—A.I.V.

		27	31	31	30	30	27	31	29	31	29	30	27	28	29	27	26	27	26	28	27	23
	115	27	31	31	30	30	27	31	29	31	29	30	27	28	29	27	26	27	26	28	27	23
	110	34	37	36	32	35	29	32	31	32	32	33	30	31	31	31	31	32	29	29	30	28
GROUP II.	109	30	31	32	29	30	29	31	30	31	30	32	29	28	28	26	24	25	24	23	22	22
	102	21	23	23	22	21	21	21	20	20	20	21	20	20	21	21	18	22	20	20	20	20
	116	22	24	25	24	24	24	25	21	25	22	24	24	24	24	21	19	24	19	25	20	20
	Av.	26.8	29.2	29.4	27.4	28.0	26.0	28.0	26.2	27.8	26.6	28.0	26.0	26.2	26.6	25.2	23.6	26.0	23.6	25.0	23.8	22.6

PERIOD 1.—DEFU.

		32	38	35	34	34	33	34	32	34	33	35	32	34	35	34	33	34	31	34	33	32
	117	32	38	35	34	34	33	34	32	34	33	35	32	34	35	34	33	34	31	34	33	32
	111	29	31	32	31	31	29	31	28	29	28	29	28	29	26	25	24	26	25	24	25	27
GROUP III.	68	30	30	27	27	28	28	27	29	32	30	31	29	33	28	30	29	28	32	28	27	28
	114	25	25	24	27	27	28	28	29	25	26	26	28	22	20	22	22	22	23	23	22	23
	104	21	22	24	25	23	22	24	22	23	23	24	24	25	25	24	23	25	24	26	26	24
	Av.	27.4	28.2	28.4	28.8	28.6	28.0	28.8	27.8	28.6	28.0	29.0	28.2	28.6	26.8	27.0	26.2	27.0	27.0	27.0	26.6	26.8

PERIOD 2.—A.I.V.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
33	34	34	33	33	35	35	33	32	34	30	32	33	33	31	33	33	33	29	31	28
26	27	26	26	27	26	25	24	24	24	24	25	25	25	24	24	23	24	22	23	24
35	34	34	36	32	34	35	33	31	33	31	34	35	36	35	34	36	35	33	32	29
24	25	24	25	26	24	24	22	24	23	22	23	24	24	23	24	23	25	25	25	23
21	21	22	22	21	21	20	21	18	18	18	20	22	23	21	21	22	21	18	17	17
27.8	28.2	28.0	28.4	27.8	28.0	27.8	26.6	25.8	26.4	25.0	26.8	27.8	28.2	26.8	27.2	27.4	27.6	25.4	25.6	24.2

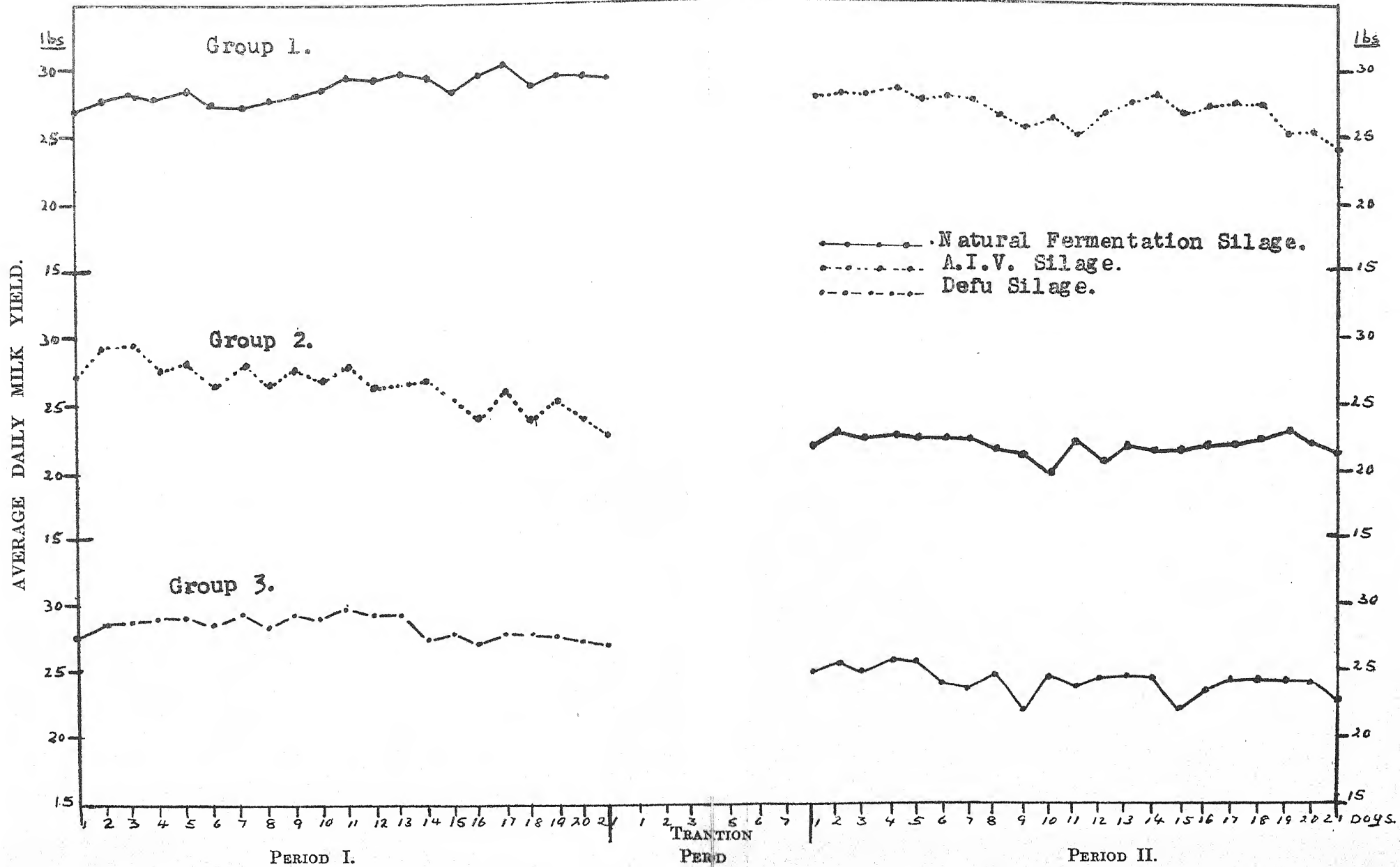
PERIOD 2.—NATURAL FERMENTATION.

23	25	23	22	23	22	24	24	23	23	24	19	25	22	23	25	23	23	23	21	23
27	27	27	29	27	27	26	26	24	25	25	26	27	28	27	26	25	27	25	27	25
24	26	24	25	24	24	24	22	22	19	22	21	20	22	22	23	24	25	25	26	23
17	18	18	19	19	19	18	18	18	19	18	18	18	16	17	17	18	18	17	17	17
18	19	19	19	20	20	20	18	18	13	22	10	19	19	19	19	20	20	19	20	18
21.8	23.0	22.2	22.8	22.6	22.4	22.4	21.6	21.0	10.8	22.2	20.6	21.8	21.4	21.6	22.0	22.0	22.6	21.8	22.2	21.2

PERIOD 2.—NATURAL FERMENTATION.

30	31	32	31	32	31	31	30	29	31	30	30	30	24	20	27	28	29	28	27	27
25	25	26	27	26	25	25	25	24	24	25	25	26	25	24	24	26	24	26	25	23
24	27	22	27	27	21	23	25	17	25	22	24	26	25	24	26	26	25	26	26	24
20	20	21	20	20	20	18	21	19	21	20	21	21	24	21	20	22	22	21	22	21
23	23	23	22	22	21	20	22	19	22	21	21	20	25	19	21	20	21	20	22	19
24.4	25.2	24.8	25.4	25.4	23.6	23.4	24.6	21.6	24.6	23.6	24.2	24.6	24.6	21.6	23.6	24.4	24.2	24.2	24.4	22.8

DIAGRAM B.
AVERAGE DAILY MILK YIELD FOR EACH GROUP.



CAROTENE CONTENT OF BUTTER.

Preliminary work carried out up to the present would indicate that the difference between the carotene content of butter from cows fed on properly made natural fermentation grass silage and that of butter from cows fed on silage produced by acid treatments is not as great as had been anticipated. Further experimental work in this connection is in progress.

GENERAL SUMMARY AND CONCLUSIONS.

The general principles of grass silage production are outlined. Attention is directed to the losses of nutritive material which may be incurred during the ensiling process and to the methods recommended for their minimisation. The production of grass silage in different types of silo and by different methods is described in detail and discussed.

From the results of the experiments carried out and observations made during their progress, the following conclusions have been drawn :—

1. Grass silage of excellent quality may be produced in an inexpensive concrete silo from unchaffed material.
2. Grass containing a high proportion of stemmy material is not as suitable for ensiling as that of a more leafy type, especially by the acid methods, owing to the difficulty in obtaining close packing.
3. Small wooden silos are not suitable for silage production, even by the acid method, under conditions in Saorstát Éireann.
4. The production of silage by acid treatments entails a great deal more labour and delay than are incurred in the making of natural fermentation silage.
5. The addition of acids or of acids and sugar to grass at the time of ensiling, results in a reduction in the loss of dry matter.
6. The acidification of green material at the time of ensiling, produces a medium suitable for mould development both during the period of storage and emptying of the silo, and moulds may develop to such an extent as to offset the saving of dry matter effected by the addition of acid.
7. While the addition of acids or acids and sugar does not entirely prevent true protein degradation, it reduces appreciably the extent to which this takes place. It is doubtful, however, whether the reduction so brought about would compensate for the extra expense involved.
8. In the feeding of dairy cows it would appear that grass silage produced by acid treatments is of about equal feeding value to that produced by natural fermentation.
9. The production of grass silage by the natural fermentation method, when carefully carried out, is considered to be the most convenient, reliable and economical for general adoption where the grass must be cut at such a stage of growth that it can be handled by the ordinary farm machinery.

THE SELECTION OF IRISH FREE STATE CREAMERY BUTTER FOR COLD STORAGE.

By G. VAN B. GILMOUR, PH.D. (Lond.), F.I.C.,
and PAUL S. ARUP, PH.D. (Lond.), F.I.C.

An investigation was carried out in 1932-33 at the Department's Butter Testing Station in continuation of investigations dealing with the relationship between bacteriological and chemical analyses and the keeping-qualities in cold storage of fresh cream butter. The results of two investigations have already been published in the Department's Journal (Vol. 31, No. 2, page 179, and Vol. 32, No. 2, page 257). Much valuable information was obtained from this work, but chiefly of a negative nature, *i.e.*, the elimination of possible factors in cold storage deterioration. It was definitely shown, however, that the acidity of butter is a factor influencing its keeping properties in cold storage, and that acidities indicated by pH values are more valuable in this connection than are figures giving total titratable acidity.

In choosing butter for the 1932-33 investigation, consideration was given only to pH values and flavour scores, with the object of confirming the importance of acidity in relation to cold storage. Accordingly, seventy-two 56lb. boxes were selected from Surprise Butter Inspections over the period August to October, 1932. They were so chosen that they fell into four groups, viz. :—

- | | |
|------|-------------------------------------------------------|
| I. | Exhibits marked high in flavour having high pH value. |
| II. | “ “ “ “ “ low “ |
| III. | “ “ low “ “ high “ |
| IV. | “ “ “ “ “ low “ |

Each group contained 18 exhibits, and all the boxes were cold-stored for six months at a temperature of approximately -7°C .

The pH value was determined for each box of butter on its arrival at the “Station,” then again immediately before being placed in the cold store, and finally after the six months' storage period. It was found in all cases that the pH value did not alter appreciably. The Quinhydrone-Calomel electrometric method was used for the determination of the pH values, the procedure being the same as that described in the Journal of the Department of Agriculture, Vol. 31, No. 2, page 180.

In addition to pH values being determined, the exhibits selected were analysed for curd and titratable acidity. Discussion of flavour scores in relation to curd content and titratable acidity will be treated separately.

The butters were scored for flavour before and after storage, as in the previous investigations. No exhibit was chosen with flavour score below the minimum export figure, viz., 162. In Tables I. and II. are set out the average flavour scores of the groups before and after storage, the pH values, the variations in flavour score and pH value for each group, also the flavour score losses or gains.

TABLE I.—GROUP FLAVOUR SCORES AND pH VALUES.

	Number of Exhibits in Group	Average Flavour Score before Storage	Average Flavour Score after Storage	Average Group loss or gain in Flavour Score	Variation in Flavour Score before Storage	Variation in Flavour Score after Storage	Average pH Value of Group on entering Cold Store	Variation in pH Value of Exhibits in Group
GROUP I. High Flavour and High pH Value ..	18	171.06	169.11	-1.95	170-172	165-172	7.31	7.10-7.55
GROUP II. High Flavour and Low pH Value ..	18	170.72	167.33	-3.39	170-173	164-169	6.43	6.10-6.65
GROUP III. Low Flavour and High pH Value ..	18	167.33	168.83	+1.50	164-169	165-171	7.06	6.75-7.35
GROUP IV. Low Flavour and Low pH Value ..	18	165.89	164.72	-1.17	162-169	157-171	6.34	5.60-6.75

TABLE II.—LOSS OR GAIN IN FLAVOUR POINTS AFTER STORAGE.

	Number of Exhibits in Group	NUMBER OF EXHIBITS SCORING :										Total Points gained by Group	Total Points lost by Group	Number of Exhibits losing more than 3 Points
		Higher	The same	1 Point Lower	2 Points Lower	3 Points Lower	4 Points Lower	5 Points Lower	6 Points Lower	7 Points Lower	8 Points Lower	9 Points Lower		
GROUP I. High Flavour and High pH Value	18	2	0	5	5	5	0	0	0	1	0	0	31	1
GROUP II High Flavour and Low pH Value	18	0	0	0	8	5	0	1	3	1	0	0	61	5
GROUP III. Low Flavour and High pH Value	18	11	4	3	0	0	0	0	0	0	0	0	3	0
GROUP IV. Low Flavour and Low pH Value	18	5	3	3	0	4	0	0	0	2	0	1	38	3

Discussion of results :—

Group I.—This group having been chosen from exhibits marked high in flavour, naturally very few samples were likely to be marked up after storage ; indeed, the majority should fall, and this is what actually happened. The quality of the butter after storage was still of high grade. The average fall in flavour of the group was less than two points, and only one box fell more than three points, while two boxes were marked up.

Group II.—The butters forming this group stored very badly. No exhibit in it was marked up, the average fall in flavour was 3.39 points, and five boxes lost more than three points each. The group lost altogether 61 points compared with 31 lost by Group I.

Group III.—The keeping qualities of this group proved excellent. After storage the average flavour score was very nearly as high as that of Group I. There was an average gain in flavour of one and a half points, and no exhibit fell more than one point. The group as a whole gained 30 points, and only 3 points were lost. Whatever was responsible for the low flavour scores of the majority of the butters of the group, this became less objectionable during the storage period.

Group IV.—The butters in this group, though rather low in flavour score, fell still further in quality on storage ; the average fall being 1.17 points. Three exhibits lost more than three points, and five fell below export standard. The group lost 38 points and gained 17 points.

Conclusions :—

It follows from the results obtained in this investigation that unripened cream butters with high pH values keep better in cold storage than those giving low values. When choosing butters for cold storage, supplies should be drawn from creameries whose butter consistently shows high pH values, and preferably from creameries whose exhibits at the same time average high marks at the Surprise Butter Inspections.

Freshly made butters with low pH values have a tendency to be marked down in flavour, compared with those having high pH values (see Department's Journal, Vol. 32, No. 2, page 257), and from this investigation it is seen that even when butters with low pH values are marked high in flavour, they deteriorate more in cold storage than those with high pH values of an equivalent flavour score. There is consequently good evidence that the storing of butter from creameries producing a product of low pH value is not advisable.

As regards the fixing of a standard pH value for guidance when storing butter, the following standard might be used tentatively : fresh cream butter can be considered satisfactory for cold storage when produced at a creamery whose average pH value for exhibits at the Surprise Butter Inspections in the previous year did not fall below 6.70.

Unripened cream butter made at creameries in the Irish Free State should

have a pH value averaging about 7, and when the pH value falls below 6.70, the trouble can usually be traced to acid milk being accepted rather than to the development of acidity in the cream after separation. Managers of creameries ought to be on the alert when they find their exhibits at the Surprise Butter Inspections reported as having low pH values. There are, doubtless, certain districts in the country where, for various reasons, the quality of milk delivered at the creameries is not so high as it should be, but even in such places, with the exercise of a little more care, an improvement could be effected which would be well worth the extra trouble taken.

CHEMICAL.

The acidities and the curd percentages were determined on the samples by the same methods as were used in the two previous investigations on keeping properties of butter in cold storage (Journal of the Department of Agriculture, 1st Series, 1932, XXXI. 2, p. 179, and 2nd Series, 1933, XXXII. 2, p. 257), the actual methods being described in the first-mentioned publication. For convenience, it may be mentioned that the acidity figures represent the titratable acidity of the whole butter, being reckoned as cc. of decinormal soda per 100 grams of butter, they do not refer to the butter serum, as is the case with the pH values.

Acidity.—From the work recorded in the two publications mentioned above, it appeared that there was a general relationship between the keeping properties and the acidities; thus, butters having high acidities did not keep so well as those with low acidities. In the second of these publications it was further shown that the pH value is a sharper indicator of keeping properties than the acidity. This is confirmed by the figures shown in the accompanying table :—

	No. of Samples	PH FIGURE		ACIDITY FIGURE		CURD PER CENT.	
		Average	Variations	Average	Variations	Average	Variations
Group I. ..	18	7.31	7.10-7.55	9.5	7-13	0.30	0.23-0.41
„ II. ..	18	6.43	6.10-6.65	10.6	8-14	0.36	0.27-0.47
„ III. ..	18	7.06	6.75-7.35	9.5	7-13	0.30	0.20-0.44
„ IV. ..	18	6.34	5.60-6.75	11.6	8-17	0.36	0.23-0.46

The groups in this table correspond with the groups in the table in the previous section, *i.e.* :—

Group I.	High flavour score and high pH value.					
„ II.	„	„	„	low	„	
„ III.	Low	„	„	high	„	
„ IV.	„	„	„	low	„	

There is to be observed a parallel between the average acidities and the average pH figures (high acidity corresponding to low pH), but on considering the variations in both cases, it may be seen, even from a casual inspection, that the pH values in the various groups show smaller variations than the corresponding acidity figures.

The opinion set out in the second publication that the pH value would probably prove a better criterion of keeping properties than the acidity is, therefore, confirmed. The acidity, it may be noted, was found to be the best of the chemical methods investigated for the indication of keeping properties, but it may now be regarded as definitely surpassed for this purpose by the pH determination.

Curd Percentage.—The table confirms previous experience that the groups of samples which keep best on cold storage, show lower average curd percentages than those groups of samples which do not keep so well, and also that the higher curd percentages tend to be associated with the higher acidities, though these relationships only appear on the average figures and are not obvious when individual samples only are considered.

SUMMARY.

The investigation was undertaken with the object of determining whether unripened cream butter with high pH value keeps better than that with low pH value.

Seventy-two 56lb. boxes of butter were selected from exhibits at Surprise Butter Inspection and cold-stored for six months at a temperature of, approximately, 7°C.

The butters were selected so as to fall into four groups of 18 each, viz.: I., butters with high pH value and high flavour score; II., butters with low pH value and high flavour score; III., butters with high pH value and low flavour score; and IV., butters with low pH value and low flavour score.

The Department's Dairy Inspectors judged the exhibits for flavour before and after storage: pH value, curd percentage and titratable acidity were determined on all the butters.

Butters with high pH value kept much better than those with low pH value. Groups with high pH value had a lower average curd percentage than those with low pH value.

Results favoured pH determinations as being a better guide to keeping properties than titratable acidity figures.

A tentative pH standard figure of not less than 6.70 is suggested for butters to be cold stored.



NATIONAL PLOUGHING CHAMPIONSHIPS

Of all the various trials of strength and skill promoted throughout the country, none is so truly rural or so essentially in the spirit of a farming people as is the ploughing match. It has been truly said that an Irishman's weakness is a good horse, and the era in which this weakness first asserted itself in the Irish character matters perhaps little. The occurrence of the words "eac," "larac" and "capall" in the place names of the country, the hunting stories of our oldest legends and the specimens of golden bits and other harness in our museums dating from the La Tene period, all go to show that for a thousand years before the Christian era horses and horsemanship were held in high esteem in the country. References to ploughs and ploughing may be of less frequent occurrence than those to horses but this is only what would be expected despite any popularity the plough might have had. The fact that we find engravings of ploughs on tombstones and such like places in our ancient abbeys and monasteries indicates, however, that no sooner had the extensive cultivation of crops become an established practice in the country than the plough became the emblem of farm husbandry. Naturally, therefore, a competition combining skill in horsemanship and in the use of an implement which, since the early days of monastic life at least, had been used as a symbol of domestic life in the country would appeal particularly to our people.

At some future date, when the materials from which our social history may be learnt in detail are available, it may be possible to say to what extent, if any, ploughing competitions occurred in Ireland before the end of the eighteenth century. In England they are mentioned as occurring from about the year 1715 onwards and are stated to have originated with the steel plough. Iron ploughs had been in use in Ireland from very early times. In Calendar of Judiciary Rolls of Ireland 1295 to 1308 it is mentioned that an iron plough was value for half the price of a bullock, and while plough-making firms may have encouraged ploughing competitions to further the sale of steel ploughs, it is quite probable that competitions of this kind are of much earlier date and were in existence during the time of the iron plough.

Following the complete embargo of 1666 placed on Irish livestock and meat entering England, the country gradually reverted to crop production. Although the tranquility of many rural areas was broken by the Jacobite and Williamite wars, this period of tillage was more or less continuous till the Repeal of the corn laws and the famine. Ploughing during this period was a matter of importance and as early as 1750 the Dublin Society, now the Royal Dublin Society, were offering premiums for ploughing with oxen. These premiums, however, were not at first in the nature of prizes for ploughing competitions as they came to be known fifty years or so later.

To the various farming societies throughout the country evidently belongs the credit for a great deal of the popularity of ploughing matches in the early years of the nineteenth century. In a book on Wicklow Farming written in 1812 by Rev. Thos. Raddeliff, one of the members of the Dublin Farming Society, is the following note regarding one of the principal farmers in the county—"At ploughing matches within the county, Mrs. Tighe (Rossana, Rathnew) has not been an unsuccessful candidate, witness the last in which her plough with bullocks obtained the medal of the Farming Society, as second in a competition of twelve."

The first volume of the *Irish Farmers' Journal* contains a report under date 5th March, 1813, of the ploughing match held at Rathnew of which the following were the winners:—

1st Premium,	Thos. Hall, ploughman to Mr. Cotter	.. 4 gns.
2nd	„ Jno. Hicken, „ „	.. 3 „
3rd	„ Jas. Kavanagh, „ Mr. Winders	2 „
4th	„ R. Taylor, „ Mrs. Tighe	.. 1 „

The same journal contains under date 24th February, 1814, the following schedule of prizes for the Dublin Ploughing Match:—

1. "To the person who shall plough with horses or mules at least 5 inches deep in the best manner .. £20
To the next best ditto £10
- 2 To the person who shall plough with Bulls, oxen or heifers at least 5 inches deep in the best manner .. £20
To the next best ditto £10
3. To the person who shall plough the best .. The Cup
4. To the ploughman who shall plough with horses or mules at least 5 inches deep in the best manner .. £5
To the next best ditto £3
5. To the ploughman who shall plough with Bulls, oxen or heifers at least 5 inches deep in the best manner £5
To the next best ditto £3 "

The evolutions of a hundred and twenty years do not detract from the munificence of such prizes as offered in this schedule.

During the nineteenth century ploughing competitions were held all over the country, their incidence varying very much with the fortunes of arable farming. After the repeal of the corn laws in 1846 the total area under crops began to fall rapidly; ploughing became less important in the life of the people in country districts and ploughing matches experienced a lean period for a number of years. Under the patronage of the County

Committees of Agriculture, however, they were revived, and in 1906 the Department instituted the provision of subsidies to ploughing matches. These subsidies which have been paid through the County Committees have been in existence since that date. The year 1917 seems to have been the peak year for ploughing matches during the period of tillage activity brought about by the war. In that year subsidies were paid to 101 ploughing associations for matches throughout the whole of Ireland. Civil disturbances combined with the decline in tillage had their effect from shortly after this time till, for the ploughing season of 1928-29, only 7 subsidies were paid to ploughing associations by Committees.

About this time an effort was made by a number of people to revive ploughing competitions, and the National Ploughing Association was formed with Mr. J. J. Bergin as Hon. Secretary, to whom is due much of the credit of bringing the Association to its present flourishing condition. Ploughing matches were organised in many counties and in 1931 the first inter-county or National Ploughing Championship was held in South Kildare. The next was held in County Wexford, the third in County Dublin, and the fourth in County Galway at the Agricultural School, Athenry.

Valuable cups and money prizes were contributed to the Association by public bodies and by private individuals, and during the four years over which National Ploughing Championships have been held the influence of the work of the Association has spread throughout the whole country. The promotion of ploughing competitions and the consequent interest created in good ploughing in the country has, of course, been merely the means to the main object of the Association, the extension of tillage and the advancement of the "back to the land" policy which has been its motto. In recognition of the effort of the Association in the interests of the country and as a mark of public approval of the lines along which these efforts were being directed it was considered advisable by the Minister for Agriculture to present the Association with a trophy for annual competition at the National Championships.

Of the various forms which such a trophy might take it was considered that a shield, of which a photo is reproduced herein, was the most commendable. The shield, which is to be known as "The Minister for Agriculture Perpetual Challenge Shield," is of solid silver, mounted on ebonised mahogany and is of beautiful design and workmanship. The ornamentation is entirely hand-chased and engraved on the silver and is a credit to Dublin craftsmanship. On the central field, which is surrounded by a pair of cornucopiae, are engraved a ploughman with plough and team. This engraving is from a photograph taken at the 1933 championships of Edward Jones's team and it is rather a coincidence that this Wexford competitor was a member of the present year's winning trio. Beneath this picture is a scroll with the inscription: "Ar na bronnadh ag an Aire Talmhaiochta," and surrounding this and the central field is a band of Celtic interlacing with four bosses on which are engraved the arms of the four provinces. A band of wheat entwined with ribbon and bound at the bottom with a

harvest knot is worked around each side of the shield. On the ribbon will be engraved the name of the county whose team is awarded the championship each year. The name of the Ploughing Association is rendered in Irish on a band extending across the upper portion of the shield :—
 “Comhlachas Náisiunta na Treabhdóireachta,” while an inscription on a plate above the silver shield indicates that it is to be held each year by the County Committee of Agriculture of the county whose team is awarded the championship at the inter-county contests conducted by the National Ploughing Association.

The shield was first presented for competition at the 1934 Championships, County Wexford having the honour of being the first county to have its name inscribed upon it. The names of the three ploughmen of the team who brought this honour to their county long famed for its husbandry are—

Michael Redmond	..	(Pierce Plough)
Edward Jones	..	”
Mathew Tobin	..	”

To each ploughman was presented a parchment certificate as a memento of his performance—a performance and an honour surely worthy of the best efforts of our country’s farmers and ploughmen to emulate.

J. O’LOAN.

FIELD EXPERIMENTS, 1933.

The following Report deals with Field Experiments conducted in 1933 which comprised trials with varieties of wheat and oats, tests with wheat on lea, clare phosphate on swedes and meadow on peaty soils, and manurial trials on grasslands.

The detailed returns in respect of each test conducted by Agricultural Instructors may be found in the annual reports issued by the Committees of Agriculture ; and farmers and others interested are recommended to apply for a copy of the report to the Agricultural Instructor or to the Secretary of the Committee of Agriculture for the County.

EXPERIMENTS WITH VARIETIES OF CROPS.

WHEAT.

In connection with the policy of extending the area under wheat in this country and in accordance with the Department's usual custom in past years of conducting wheat variety trials through the medium of the Agricultural Instructors, experiments, with the object of comparing the relative suitability of different varieties of Winter Wheat for Cultivation in the Saorstát, were carried out in each of the twenty-six counties during the season 1932-33. In these experiments, which were laid down in the Autumn months of 1932, except at two centres in one district in County Cork, where the seed was not sown until the last week of January, 1933, the varieties officially included were Iron Master, Yeoman II and Queen Wilhelmina. The seed of Iron Master and Yeoman II used in these trials was the produce of crops grown at the Albert Agricultural College, Glasnevin, and before distribution to the Instructors, a representative sample of each variety was subject to a germination test and found to be of a high standard. The seed of Queen Wilhelmina as well as that of Square Head Master, a variety whose inclusion in the trials was left to the discretion of the Instructors, was obtained through local seed merchants from imported seed. Square Head Master was included in the trials at almost all the centres.

The weather during the late Autumn months was unusually good, and the preparation of the seed bed and sowing of the seed was consequently carried out under most favourable conditions, and, with few exceptions, satisfactory yields were obtained. A detailed statement of the yields obtained is given in table I.

TABLE I.
SMALL SCALE WHEAT VARIETY TRIALS, 1932-33

Instructor	Character of Soil	Date of Sowing	YEOMAN II.		QUEEN WILHELMINA		IRON MASTER		SQUAREHEAD MASTER	
			Grain	Straw	Grain	Straw	Grain	Straw	Grain	Straw
J. Kelly ...	... Medium loam ...	6/11/32	c. q.	c. q.	c. q.	c. q.	c. q.	c. q.	c. q.	c. q.
...	... Rich loam ...	10/11/32	21 0	38 1	18 2	34 3	23 2	40 1	—	—
P. V. Coghlan ...	... Light loam ...	14/11/32	16 2	30 0	22 1	45 0	21 1	40 0	18 2	40 0
...	... Deep loam ...	12/11/32	30 2	40 0	30 0	45 0	38 0	50 0	22 2	44 0
W. Gahan ...	... Light loam ...	31/10/32	19 0	35 0	22 3	38 0	20 3	39 0	—	—
...	... Medium loam ...	8/11/32	17 1	33 0	22 3	39 0	24 0	36 0	18 3	38 0
T. Healy ...	... Heavy limestone loam, very rich.	11/11/32	30 0	51 0	28 2	44 3	27 0	48 2	24 1	50 0
...	... Medium limestone loam ...	21/11/32	21 2	37 0	23 2	42 3	22 3	40 1	24 1	44 1
D. Hector ...	... Medium sandstone loam ...	3/11/32	23 3	38 0	28 2	41 2	28 0	41 2	—	—
...	... Clay loam ...	2/11/32	15 3	33 0	23 1	35 3	19 0	34 1	16 3	35 0
D. J. Curran ...	... Medium loam ...	8/11/32	21 0	—	20 0	—	18 0	—	17 0	—
...	... Heavy loam ...	24/11/32	16 3	32 3	25 0	26 3	17 1	26 1	17 2	28 1
J. Scott ...	... Heavy loam ...	26/11/32	16 0	24 2	16 3	26 2	18 2	25 0	16 2	28 0
...	... Deep loam ...	16/11/32	14 1	21 1	21 3	33 2	18 0	20 3	21 1	32 0
P. F. Molony ...	... Medium sandstone loam ...	13/10/32	15 3	19 3	22 1	17 1	18 0	17 3	22 2	30 0
...	...	28/11/32	15 2	22 3	24 2	22 3	17 2	18 3	16 2	27 0
P. O'Loan ...	... Clay loam ...	30/1/33	13 1	30 1	16 2	34 2	—	—	14 0	32 0
...	... Light loam ...	25/1/33	16 3	—	18 1	—	—	—	20 0	—
J. J. Mills ...	... Deep medium loam ...	18/11/32	6 3	15 2	18 0	32 0	19 2	26 0	25 2	41 2
M. Connor ...	... Stiff clay loam ...	16/11/32	28 2	49 2	21 3	31 1	18 1	32 0	30 2	46 3
...	... Clay loam ...	9/11/32	36 3	43 1	20 0	40 1	31 2	36 3	36 1	45 3
...	... Loam ...	7/11/32	39 1	42 1	40 1	40 2	39 0	36 3	36 2	42 0
G. C. Kelly ...	... Strong limestone loam (rather cold).	—/11/32	10 0	25 0	16 2	32 0	12 2	26 0	14 0	28 0
T. Cotter ...	... Light limestone loam ...	11/11/32	16 2	25 0	18 2	28 0	17 3	28 0	17 0	27 0
...	... Clay loam (limestone) ...	5/11/32	16 3	25 0	17 1	27 0	16 2	28 0	16 1	26 0
J. Scully ...	... Light loam ...	14/11/32	22 2	46 2	28 3	60 2	25 1	52 1	21 3	49 0
...	... Deep gravelly loam ...	8/11/32	16 0	53 0	25 0	64 0	17 3	50 2	16 1	50 1
D. O'Connell ...	... Gravelly loam ...	9/11/32	16 3	27 2	16 1	27 0	16 3	28 0	18 1	28 3
J. Crowley ...	... Loam ...	18/11/32	27 0	45 0	20 2	48 2	26 3	43 3	27 2	49 3
...	...	14/11/32	23 2	43 0	26 3	45 3	28 0	42 2	27 0	42 2
D. A. Humphreys ...	... Medium limestone loam ...	4/11/32	33 0	76 2	38 3	70 3	37 2	74 0	34 0	93 0
...	... Medium loam ...	7/11/32	20 0	—	26 2	—	26 0	—	21 0	—
...	... Clay loam (limestone) ...	—	22 0	66 2	22 2	74 0	23 2	74 0	25 0	75 0
...	... Medium loam (red sandstone).	—	19 2	55 2	26 0	62 0	16 2	50 2	20 0	65 0
T. Tynan ...	... Loam ...	2/11/32	19 1	26 0	24 1	29 0	22 3	31 0	20 1	28 0
...	... Clay loam ...	7/11/32	19 0	24 1	24 0	27 2	21 1	29 0	18 1	26 1
J. J. O'Sullivan ...	... Loam ...	19 2	35 2	23 0	36 2	—	21 1	30 0	—	—
M. J. O'Leary ...	... Light limestone medium loam.	6/12/32	17 0	27 0	21 3	32 0	22 0	33 0	17 2	32 0
...	... Heavy limestone loam ...	9/12/32	10 0	34 2	27 1	36 0	22 2	38 2	21 3	36 3
M. Gleeson ...	... Clay loam ...	7/11/32	18 0	40 0	18 0	38 0	21 0	42 0	18 0	38 0
...	... Loam ...	8/11/32	14 2	26 0	10 2	30 0	10 2	26 0	12 2	23 0
P. J. Clancy ...	... Medium loam ...	14/11/32	18 0	28 2	19 1	31 0	21 1	30 1	18 2	32 0
...	... Heavy loam ...	2/12/32	22 3	36 1	18 2	33 0	20 1	33 3	26 4	29 2
C. O'Donovan ...	... Light clay ...	28/10/32	22 2	33 2	27 2	38 2	23 3	33 1	21 2	38 1
...	...	5/11/32	24 1	35 0	26 3	39 0	25 3	38 0	25 0	37 0
D. Molloy ...	... Medium Loam ...	22/10/32	17 1	32 3	17 3	35 0	18 1	34 0	19 0	34 2
...	...	7/11/32	20 1	34 0	22 1	35 2	21 3	35 0	20 2	34 2
J. O'Callaghan ...	... Deep rich loam ...	—	21 2	36 0	20 3	36 0	20 0	35 0	—	—
W. J. Corcoran ...	... Clay loam ...	—/11/32	26 1	50 0	27 0	55 0	26 1	53 0	22 2	52 0
...	...	—/11/32	24 0	—	22 2	—	24 2	—	19 0	—
R. A. McIvor ...	... Medium loam ...	—/10/32	30 1	48 0	26 2	42 2	34 2	54 0	25 3	52 0
...	... Light loam ...	—/10/32	35 0	44 2	26 3	46 0	30 1	52 0	28 2	55 0
D. Coady ...	... Medium loam ...	7/11/32	21 3	30 1	25 1	35 0	25 0	33 2	19 3	33 0
...	... Strong loam ...	4/11/32	24 2	31 0	25 1	33 2	25 0	32 1	20 2	32 2
P. J. Colgan ...	... Heavy loam ...	8/11/32	27 0	32 3	29 2	37 2	29 0	34 3	21 3	32 0
...	... Medium loam ...	26/11/32	20 0	28 2	28 2	34 0	28 0	36 0	24 2	36 0
N. P. Cotter ...	... Medium loam ...	—	22 0	20 2	28 0	36 0	—	—	26 2	32 0
...	... Light medium loam ...	26/10/32	18 2	—	13 0	—	19 1	—	16 2	—
M. Hession ...	... Medium loam ...	—/10/32	19 1	—	19 0	—	21 2	—	21 3	—
M. H. McDonagh ...	... Medium loam ...	—/11/32	17 2	38 1	19 3	40 1	18 1	35 2	—	—
...	... Clay loam ...	14/11/32	27 2	44 2	28 1	44 1	25 3	42 2	23 3	41 2
...	... Rich clay loam ...	4/11/32	22 3	36 0	24 3	41 0	30 3	44 0	19 3	32 0
...	... Clay loam ...	15/11/32	16 2	35 2	28 3	47 1	19 1	37 3	15 3	31 1
J. W. Browne ...	... Medium clay ...	18/11/32	15 3	20 0	17 1	33 2	18 1	36 2	15 1	29 2
C. Cogan ...	... Light loam ...	15/11/32	22 2	34 2	20 2	34 0	18 2	38 2	24 0	36 2
...	... Light sandy loam ...	28/11/32	24 2	36 1	30 2	45 0	20 1	45 3	—	—
...	... Heavy loam ...	14/11/32	26 1	39 2	30 1	46 3	22 3	41 3	29 0	44 3
J. J. Hogan ...	... Heavy clay ...	16/12/32	21 3	36 3	28 2	45 2	22 2	43 2	18 0	35 1
...	...	9/11/32	26 1	38 2	24 0	40 1	23 0	37 0	19 1	39 0
E. McGauran ...	... Strong loam ...	16/11/32	18 3	39 0	24 2	41 2	21 1	37 2	19 3	37 2
...	... Rich loam ...	3/11/32	27 0	33 0	30 2	38 0	28 0	35 0	24 0	33 0
...	...	10/11/32	24 1	35 0	24 3	35 0	27 3	38 0	25 1	38 0
Average ...	...	—	21 0 (72)	—	23 2 (72)	—	22 3 (69)	—	21 2 (84)	—

It will be observed that the variety Queen Wilhelmina not only produced the greatest average yield of grain and straw, as it has consistently done in all the years since this variety was included in similar trials, but that at 41 out of the 72 centres where the trials were conducted it produced the heaviest crop.

This variety produces a white plump grain of average milling quality, and as it withstands the Winter conditions well, it is undoubtedly the most suitable Winter wheat for general cultivation in the Saorstat. It can be sown with safety even up to end of February. Iron Master is a red wheat with a strong straw of medium length, a dense, heavy ear and a large plump grain. This variety was included in the trials for the first time in 1930, and each year since it has produced on the average a yield second to that of Queen Wilhelmina. It withstands our Winter climatic conditions reasonably well, but on account of the large grain it requires to be sown at a thicker rate of seeding than the other varieties in the trials.

Square Head Master produced the third highest yield of grain on the average. It is a red wheat well suited to stiff cold soil and exposed situations, and may be sown with safety up to end of February.

Yeoman II has a strong stiff straw and resists lodging well. It develops slowly during the Winter and Spring and, consequently, should be sown early in the Autumn in clean good soil, otherwise it is liable to be smothered out by weeds. On the lighter types of soil this variety is liable to produce small inferior grain, and is not so generally suitable for cultivation in Saorstat Eireann as Queen Wilhelmina. It is significant that Yeoman II provided at the Donegal centre what may be regarded as the only failure in the whole series. While this is scarcely sufficient evidence that Yeoman is not at all suitable in Northern districts, it is perhaps an indication that other varieties such as Queen Wilhelmina or Square Head Master should certainly get preference in such districts.

TRIALS WITH WHEAT ON OLD LEA.

WHEAT ON LEA.

In general farming practice it has not been the custom to grow wheat on old lea land, neither is it the universal opinion that good crops of wheat can be grown on land that has been in grass for any lengthened period. On the other hand, some of the other cereals, notably oats, generally occupy that position in the rotation with results equally as satisfactory as those obtained where the oats have been grown after a manured root crop. There is no conceivable reason why wheat could not be grown successfully on old lea if reasonable precautions are taken in regard to the ploughing of the soil and the production of a firm seed bed. Figures were not available, however, to compare the results obtained from wheat grown on old lea with those obtained from wheat grown after potatoes or roots, the usual position in the rotation which the crop occupies. With the object of ascertaining definite figures showing the yield of grain which would be produced from wheat grown on lea land, it was decided that a series of experiments should be carried out during the season 1932-33 by

the Agricultural Instructors. These experiments were conducted at 77 centres in 18 counties in the Saorstat. Details of the results are shown in table II.

The results are shown under three heads, (1) where the land was in grass for not more than 4 years, (2) where the land was in grass from 5-7 years inclusive, and (3) where the land was in grass from 8 years upwards to even as long a period as 60 years in a few instances.

Under the first heading the wheat crops were grown at only 7 centres. Queen Wilhelmina was included at six of these centres, and produced on an average 23c. 0qr. per statute acre, while Red Marvel at the remaining centre gave a yield of 17c. 2qrs. Land in grass for not more than 4 years might be considered land in rotation, and in many cases would be enriched owing to clover present, hence results in such cases might be as good as those in the case of wheat grown after tillage crops.

In the case of the crops grown where the lea was from 5-7 years duration Queen Wilhelmina was grown at five centres and produced an average yield of 23cwt. 1qr. per statute acre.

Square Head Master was grown at four centres and produced on an average 20cwt. 2qrs. per statute acre.

Red Marvel at one centre produced a yield of 21 cwt. and Yeoman II at one centre gave a yield of 17 cwt. per statute acre. The average yield for all the varieties grown at the eleven centres where the trials were conducted on lea from 5 to 7 years old was 21 cwt. 2 qrs. per statute acre.

In the trials conducted on lands which were in grass from eight years and upwards Queen Wilhelmina was included at 24 centres, and produced on an average 20 cwt. 3 qrs. of grain; Square Head Master at 19 centres produced an average of 18 cwt. per statute acre; Yeoman II at 5 centres gave a yield of 21 cwt. 3 qrs., and Red Marvel at 5 centres produced 17 cwt. per statute acre. The average yield at 58 centres for all varieties per statute acre on land in grass for over 8 years was 19cwt. 3 qrs. per statute acre. Having regard to the abnormally dry season which might be assumed to affect adversely wheat grown on lea land, these results compare very favourably with those obtained after a manured crop, where the average yield for all varieties at 72 centres amounted to 22 cwt. 0qr. per statute acre. From these figures, although it is not safe to make deductions from one set of trials, it is fairly evident that wheat can be grown successfully on old lea provided that—(1) the lea is ploughed early and allowed to settle down before sowing; (2) that a firm fine seed bed is provided, and that except, on the very richest soils, a suitable dressing of artificial manures is applied at the time of sowing; (3) that seed of a high standard of germination of the proper variety is used and sown early.

OATS.

The seed of the varieties of oats included in the trials conducted by the Agricultural Instructors was, as in all trials in recent years, of pure line selections; and, with the exception of the varieties Victory II and Black Tartary, all the varieties were raised by the plant breeding division of the

Agricultural Faculty of University College, Dublin, at the Albert College, Glasnevin.

The varieties Glasnevin Sonas, Glasnevin Success III and Sonas Marvellous were grown in 1932 at the Albert College farm. The seed of the remaining varieties included in the trials was propagated at Ballinacurra from the produce of pure line cultivations grown at the Albert College in 1931.

Trials with both white and black varieties were carried out during the past season. The black varieties were tried only in those districts where black oats are usually grown.

WHITE OATS TRIALS.

The white variety trials were conducted at 21 centres in 17 counties.

Detailed particulars of the results and the average yield produced from the different varieties are given in Table III.

TABLE III.

SMALL SCALE OATS VARIETY TRIALS, 1933.

WHITE OATS.

Instructor	VICTORY II.		GLASNEVIN SONAS		SONAS MARVELLOUS		GLASNEVIN SUCCESS III.		Character of Soil
	Grain	Straw	Grain	Straw	Grain	Straw	Grain	Straw	
	c. q.	cwt.	c. q.	cwt.	c. q.	cwt.	c. q.	cwt.	
P. V. Coghlan	25 2	38	27 3	45	29 2	46	28 0	35	Deep loose loam
T. Healy	28 0	—	32 2	—	23 2	—	24 2	—	—
W. Gahan	23 1	38	27 0	42	21 2	37	25 0	35	Medium loam
D. Hoctor	23 2	29	25 0	33	26 0	33	26 1	37	Clay loam
P. O'Loan	31 2	50	29 2	49	33 1	61	33 3	45	Deep rich loam
M. Connor	25 1	41	23 0	40	24 2	38	27 2	36	Sharp loam
T. Cotter	19 2	32	22 3	37	21 0	34	18 1	30	Clay loam
J. Scully	22 3	47	25 0	49	21 0	41	23 2	39	—
D. O'Connell	19 1	30	17 0	28	18 1	29	19 0	30	Light loam
M. Gleeson	24 2	30	33 2	42	33 2	40	32 0	35	—
M. J. O'Leary	22 0	32	24 2	34	23 0	32	24 0	34	Heavy limestone loam.
P. J. Clancy	23 2	35	24 1	35	25 0	34	25 1	35	—
J. O'Callaghan	19 1	36	19 2	36	20 0	36	20 1	36	Strong loam
"	20 0	38	21 2	38	21 0	37	22 0	38	Deep rich loam
D. Molloy	21 3	36	23 1	38	22 0	36	34 2	34	Rich dark loam
W. J. Corcoran	26 3	36	34 0	43	31 1	44	25 1	35	Clay loam
R. A. McIvor	17 2	35	24 1	31	26 0	37	27 0	34	Rich loam
P. J. Colgan	23 0	30	24 0	31	23 1	30	21 0	27	Heavy clay
M. Hession	16 1	31	18 1	38	20 3	39	17 1	30	Rich loam
C. Cogan	22 3	35	21 2	35	24 0	33	22 1	33	Light red sandstone loam.
P. Conroy	18 0	19	19 1	21	18 1	20	16 2	19	Deep friable loam
N. P. Cotter	22 1	—	25 2	—	24 1	—	22 3	—	—
J. W. Browne	21 1	45	26 2	48	26 0	46	24 2	45	—
Average (23 centres)	22 2	35 (21)	24 3	38 (21)	24 1	37 (21)	24 1	34 (21)	

Glasnevin Sonas again produced the highest average yield of grain—as it has in similar trials conducted each year since 1920, and at nine out of the twenty-one centres gave a greater yield than either of the other varieties. This oats does best on rich soils and resists lodging better than any other oats in cultivation in the Saorstat. On light and medium soils, however, better results may be expected from some of the other varieties included in the trials.

GLASNEVIN SUCCESS III, which was included in these variety trials for the first time in 1931, was second in average yield, and at 7 out of the 21 centres it produced a greater amount of grain than that of either of the others. This variety produces a short straw and a very nice plump grain, almost as good in quality as that of Victory II, which is generally recognised as the variety producing the best quality grain of all the varieties in cultivation in this country. It has the advantage of ripening almost a week earlier than Victory II.

SONAS MARVELLOUS was included in the variety trials for the first time in 1933. It is of the Sonas type, that is, it resists lodging to a high degree, it is late in ripening and, therefore, best suited for sowing in early districts, and on rich well manured soils. It produced in these trials an average yield almost equal to that of the best of the others. This variety is the produce of a cross between Glasnevin Sonas and Marvellous.

Victory II, although the lowest of the four varieties in average yield, is very well suited for growing under average soil conditions, and produces grain of excellent quality. It is now the most generally grown variety in the Saorstat, and, except in very rich soils where it is liable to lodge, its cultivation can be recommended.

BLACK OATS VARIETY TRIALS.

Only two varieties, viz., Black Tartary and Failte were included in the black oat variety trials, which were carried out at 26 centres in 11 counties where it is still the custom for farmers to grow black oats. Full particulars of the yields obtained at the different centres from the two varieties as well as the average yield per statute acre from all centres are shown in Table IV.

TABLE IV.
SMALL SCALE OATS VARIETY TRIALS, 1933.
BLACK OATS.

Instructor	Character of Soil	BLACK TARTARY		FAILTE	
		Grain	Straw	Grain	Straw
J. Kelly	Light sandy (granite)	c. q. 20.3	cwt. 29	c. q. 21.1	cwt. 28
D. J. Curran	—	17.0	35	23.1	36
P. J. Molony	—	27.0	43	28.2	44
P. J. Molony	Medium loam	26.3	46.	22.3	43
J. Scott	Gravelly loam (lea)	13.3	20	14.2	22
J. Scott	—	19.2	29	16.3	25
J. Scott	—	19.2	29	16.0	23
J. Crowley	Clay loam	19.2	33	18.3	34
J. Crowley	Loam	15.3	32	19.3	33
D. A. Humphreys	Medium loam	23.2	34	26.0	38
D. A. Humphreys	Sandy loam	16.1	28	19.2	34
T. Tynan	Fertile light loam	26.2	33	28.0	38
J. O'Callaghan	Sandy loam	19.2	34	19.0	34
J. O'Callaghan	Moory	20.1	38	20.0	37
D. Molloy	Peaty loam	21.1	36	22.2	34
D. Molloy	Medium loam	24.2	37	26.3	39
D. Coady	Loam	23.3	29	26.0	31
D. Coady	Medium loam	20.2	32	25.2	35
M. H. McDonagh	Clay loam	16.1	35	19.2	37
M. H. McDonagh	Sharp clay	14.2	29	16.2	32
C. Cogan	Reclaimed mountain soil	23.3	36	21.3	33
C. Cogan	Medium loam of mountainy nature.	25.0	42	31.1	44
J. J. Hogan	Sandy loam	20.1	37	20.3	37
J. J. Hogan	Medium loam	18.3	36	16.3	35
E. McGauran	Black loam	22.2	35	24.3	37
E. McGauran	Medium loam	18.0	27	22.1	30
Average (26 centres) ..		20.2	36	21.3	34

Black Tartary has proved one of the most reliable varieties of black oats grown in this country, and the great bulk of the black oats now grown in the Saorstat consists of this variety, and for the purpose of comparison in black oats variety trials, it has been used as the standard with which to compare other varieties. Failte was first included in the trials in 1931, and a description of this variety appears in the Department's Journal, Vol. XXXI. No. 1.

As was the case last year, Failte again produced not only a greater average yield, but at 18 centres out of the total of 26 at which the trials were carried out it gave a greater yield and better quality grain than Black Tartary. Its greatest draw back in comparison with Black Tartary is its lateness in ripening.

EXPERIMENTS WITH CLARE PHOSPHATES.

Experiments to compare the effect of Clare phosphate with North African mineral phosphate when applied to "swedes" and "meadow hay" on peaty soils were conducted at a number of centres during the years 1926 and 1927, and reports of the results of these trials have already appeared in the Department's Journals, Vol. XXVI. No. 4, and Vol. XXVIII. No. 1.

In 1932 a new seam of Clare phosphate was opened up, and, in order to ascertain the value of the phosphate in this seam, it was decided that the agricultural instructors should again carry out a series of experiments in which this phosphate would be tried against North African mineral phosphate on "Swedes" and "Meadow Hay." In addition it was decided that the Assistant Agricultural Overseers should carry out a number of demonstrations with the same two phosphates on poor pastures. It was proposed that each Instructor should have the trials conducted at two centres, and that at one of these centres at least the soil should be of a peaty nature. The pasture manurial demonstrations under the control of the Assistant Agricultural Overseers were likewise to be conducted at two centres, one of which was to be on peaty soil.

SWEDE MANURIAL TRIALS.

In order to ensure that any results obtained in these trials should be due to the effect of the dressing with Clare and North African mineral phosphates, it was decided that no farmyard manure should be used for these trials. Particulars as to the composition, solubility, etc., of both phosphate manures used in the experiment are shown in the following table.

Manure	Total Phos.	Water Sol.	Citrate Sol.	Fineness	Proportion of total of Phosphates Sol. in Citric Acid
	%	%	%	% mesh	%
Clare Phosphate ..	48.11	Nil	2.43	72.54 in 120	5.05
North African Mineral Phosphate.	59.36	Nil	18.84	88 in 100	31.74

The figures representing the composition, etc., of these two manures as used in the 1926 and 1927 trials are shown hereunder:—

Manure	Total Phos.	Sol.	Citrate Sol.	Fineness in 100 mesh	Proportion
Clare Phosphate ..	58.78	Nil	5.29	92.9	9.0
North African Mineral Phosphate.	56.69	Nil	21.17	89.9	37.3

In this series of trials all the plots received a dressing of 1 cwt. Sulphate of Ammonia and 3 cwt. Kainit per Statute Acre. One plot at each centre received no additional manuring and served as a control. A second plot received an additional dressing of North African Mineral Phosphate at the rate of 6 cwt. per statute acre, and to the remaining plot a dressing of Clare Phosphate was applied at the rate of 7.4 cwt. per statute acre. Plots II and III received, therefore, equivalent amounts of total phosphates.

The average returns from 51 centres where tests were carried out are shown in table V.

TABLE V.

TURNIP MANURIAL EXPERIMENTS, 1933—CLARE AND NORTH
AFRICAN PHOSPHATES ON PEATY AND OTHER SOILS.

Instructor	Character of Soil	Plot I.	Plot II.	Plot III.
		Control	Clare Phosphate 1 cwt. Sulp. Amm. 3 „ kainit.	North African Phosphate 1 cwt. Sulp. Amm. 3 „ kainit.
		T. C.	T. C.	T. C.
J. Kelly ..	Peaty loam	10 14	13 11	15 13
„ ..	Stiff clay loam	3 2	3 5	12 4
P. V. Coghlan ..	Loam	12 8	16 7	20 6
„ ..	Boggy soil	16 6	18 10	21 18
W. Gahan ..	Peaty	24 5	24 18	27 16
„ ..	Medium loam	15 0	18 2	22 2
T. Healy ..	Light limestone loam ..	20 17	19 3	26 8
P. F. Molony ..	Peaty loam	9 17	20 8	27 5
„ ..	Clay loam	8 6	11 12	19 3
D. J. Curran ..	Dark loam	15 11	23 5	23 11
„ ..	Medium sandstone loam ..	7 14	15 17	28 5
D. Hoctor ..	Medium loam	13 4	21 19	25 0
„ ..	Peaty loam on red sand- stone.	11 0	19 4	20 19
J. J. Mills ..	Rich medium loam	13 8	15 4	19 8
„ ..	Peat over clay	9 10	11 14	21 6
M. Connor ..	Heavy clay	5 8	5 16	6 14
J. Cotter ..	Peaty loam	4 5	6 3	12 14
G. C. Kelly ..	Peaty	16 4	17 0	19 10
„ ..	Medium limestone loam ..	15 8	16 0	18 5
J. Scully ..	Light peaty loam	10 6	13 11	20 14
D. O'Connell ..	Light loam	2 4	15 8	23 8
J. Crowley ..	Peaty	7 6	12 9	17 14
D. A. Humphreys ..	Sandy loam	10 11	14 8	20 4
„ ..	Medium loam	9 14	10 16	21 14
J. J. O'Sullivan ..	Clay loam	16 1	17 17	24 16
M. Gleeson ..	Limestone	18 5	21 3	26 5
„ ..	Clay loam	21 15	22 18	25 3
M. J. O'Leary ..	Medium limestone loam ..	14 10	18 0	22 10
P. J. Clancy ..	Heavy loam (rich)	22 0	28 2	29 14
„ ..	Medium loam	14 3	21 3	23 2
D. Molloy ..	Peaty soil	3 12	3 13	22 10
„ ..	Medium loam	17 5	18 8	24 15
R. A. McIvor ..	Peaty loam	18 8	18 18	24 14
„ ..	„	11 15	12 6	18 10
D. Coady ..	Stiff loam	9 5	12 7	16 10
„ ..	Strong moor	8 0	14 5	17 12
P. J. Colgan ..	Loam	23 0	24 0	30 0
„ ..	Peat	20 0	23 10	27 12
N. P. Cotter ..	Loam	33 5	37 13	38 5
M. Hession ..	Bog	19 15	22 17	22 0
„ ..	Limestone loam	28 0	35 8	31 10
M. H. McDonagh ..	Rich loam	19 13	22 10	24 17
„ ..	Rich moor	24 11	25 17	28 10
J. W. Browne ..	Peaty soil	18 0	20 10	22 10
„ ..	Medium clay	18 10	21 0	24 16
P. Conroy ..	Limestone loam	21 8	20 16	25 0
„ ..	Peaty	22 4	24 16	24 4
J. J. Hogan ..	Medium loam	11 4	12 17	22 17
„ ..	Rich loam	23 18	25 19	27 12
E. McGauran ..	Medium loam	12 4	16 8	20 2
„ ..	Peaty loam	8 10	13 6	19 5
	Average (51 centres) ..	14 14	18 1	22 14

The results of these experiments show that although Clare Phosphate produced an increase at each centre except one, its use compares unfavourably with that of North African Phosphate when applied to Swedes on any class of soil. At two centres—one in County Sligo and the other in Westmeath—where the manures were applied to peaty soils, Clare Phosphate produced a greater yield of Swedes than North African Mineral Phosphate.

At another centre in County Sligo, where the soil was described as “limestone loam,” the yield from the use of Clare Phosphate was greater than that produced from North African Mineral Phosphate. At all other centres, however, Clare Phosphate produced results inferior to those produced by the other phosphate. At one centre in County Clare, where the soil was described as light limestone loam, the result from Clare Phosphate was less than that from the plot to which no phosphates were applied. At this centre the plants on the plot dressed with Clare Phosphate remained backward from the beginning and were noticeably so at the time of thinning. After that period there was some improvement, but they never developed equal to those on the other plots.

MANURE TESTS WITH CLARE PHOSPHATE ON MEADOW HAY.

The results of previous trials conducted by the Agricultural Instructors, in which Clare Phosphate was compared with other forms of phosphatic manures when applied to meadow hay, have already appeared in the Department's Journal, Vols. XXVI, No. 4, and XXVIII, No. 1. At the centres where any increase in yield was obtained as a result of the application of Clare Phosphate, it was observed that the soils were peaty in character. With a view to obtaining more definite information as to how far this type of soil had an influence on the effects produced as a result of top dressing meadow hay with Clare and North African Mineral Phosphate, a further series of trials confined to peaty soils was carried out by the Instructors in 1930. The reports of these trials already published in the Department's Journal, Vol. XXX, No. 2, do not indicate that any special benefit was obtained from the use of Clare Phosphate on peaty soils compared with those obtained from North African Mineral phosphate.

During the season 1933 another series of trials, in which Clare phosphate from the new seam was compared with North African Mineral phosphate when applied to meadow hay, was conducted by each Agricultural Instructor in the Saorstát at two centres. It was decided that the soil should be of a peaty nature at one of the two centres at which the trials were to be conducted. The manures applied to the meadow hay were part of the same consignment used in the “Swede Manurial” trials. The composition, etc., of these manures have already appeared in this report of the Swede trials. The yields obtained at each centre, together with the average yields from 63 centres on all classes of soils are set out in table VI.

TABLE VI.

MEADOW HAY MANURIAL EXPERIMENTS, 1933

CLARE AND NORTH AFRICAN MINERAL PHOSPHATES ON PEATY
AND OTHER SOILS

Instructor	Character of Soil	Date of Application of Manure	Plot I.	Plot II.	Plot III.
			Control	Clare Phosphate 1 cwt. Sulph. Amm. 2 cwt. Kainit	North African Mineral Phosphate 1 cwt. Sulph. Amm. 2 cwt. Kainit
J. Kelly ...	Medium loam ...	T. C. Q. 13/3/33	1 13 3	T. C. Q. 2 6 2	T. C. Q. 2 11 0
" ...	Light loam ...	14/3/33	1 10 2	1 15 0	1 15 1
P. V. Coghlan ...	Peaty Soil ...	3/3/33	2 4 0	2 13 0	2 12 0
" ...	Clay loam ...	3/3/33	2 11 0	2 14 0	2 16 0
W. Gahan ...	Peaty ...	13/3/33	1 18 0	2 0 0	2 4 0
" ...	Medium loam ...	13/3/33	1 15 0	1 15 0	2 3 0
T. Healy ...	Medium loam ...	27/3/33	2 0 0	2 2 0	2 9 1
" ...	Poor peat ...	16/3/33	1 12 3	1 11 2	2 0 0
P. F. Molony ...	Medium loam ...	4/3/33	1 19 2	2 0 2	1 18 3
" ...	Peaty gravelly loam ...	20/3/33	1 15 1	2 3 2	2 0 0
J. Scott ...	Peaty ...	21/3/33	2 11 0	3 2 0	2 19 0
" ...	Light gravelly clay ...	6/3/33	2 7 2	2 4 0	2 9 3
D. Hector ...	Sandstone loam, approaching peaty.	13/3/33	2 9 0	2 9 3	2 11 3
" ...	Medium sandstone loam	6/3/33	1 17 3	2 10 1	2 7 0
P. O'Loan ...	Medium loam ...	4/4/33	1 14 3	1 14 3	1 16 2
D. J. Curran ...	Heavy loam ...	6/4/33	2 18 0	2 8 3	2 14 3
" ...	Dark loam ...	23/3/33	2 15 3	2 13 0	2 8 2
M. Connor ...	Peaty soil ...	14/3/33	2 2 2	2 9 1	2 13 2
" ...	Sandy loam ...	10/4/33	3 4 0	3 6 2	3 14 0
J. C. Kelly ...	Peaty ...	11/4/33	1 15 0	1 18 0	2 0 0
T. Cotter ...	Limestone loam ...	27/3/33	1 12 0	1 11 2	1 16 0
" ...	Peaty ...	27/3/33	1 10 0	1 11 0	1 13 2
D. O'Connell ...	Peaty loam ...	28/3/33	1 10 2	1 14 2	1 14 3
" ...	Peaty ...	30/3/33	2 6 3	2 7 2	2 16 2
J. Scully ...	Peaty ...	7/3/33	2 6 0	2 0 2	2 8 3
" ...	Peaty ...	18/3/33	1 7 1	1 8 1	1 5 3
J. Crowley ...	Clay loam ...	14/3/33	1 18 1	2 1 3	2 0 2
" ...	Peaty ...	10/3/33	1 15 1	1 18 0	1 19 3
D. A. Humphreys ...	Medium loam ...	27/3/33	1 14 2	1 10 2	1 12 0
" ...	Medium moory soil ...	27/3/33	1 8 0	1 12 1	1 13 2
D. Molloy ...	Peaty soil ...	18/3/33	1 18 0	1 18 2	2 0 0
" ...	Deep loam ...	16/3/33	2 4 0	2 4 0	2 7 3
T. Tynan ...	Peaty loam ...	26/2/33	1 15 2	1 15 1	1 18 2
" ...	Moor ...	7/3/33	2 0 1	2 3 1	2 9 0
M. Gleeson ...	Loam ...	3/3/33	3 0 0	3 5 0	3 9 0
" ...	Clay loam ...	6/3/33	2 12 0	2 17 0	3 0 0
M. J. O'Leary ...	Peaty or cutaway bog ...	21/3/33	2 12 2	2 15 0	2 17 1
" ...	Medium loam or sandstone	27/3/33	3 2 0	3 5 2	3 7 2
P. J. Clancy ...	Medium loam ...	4/4/33	1 4 0	2 0 0	2 16 2
" ...	Stiff clay ...	3/4/33	1 5 1	2 4 0	2 10 1
J. J. O'Sullivan ...	Upland clay (heavy) ...	14/3/33	2 4 0	2 9 1	2 14 2
" ...	Light peaty soil ...	14/3/33	2 4 2	2 8 0	2 14 0
W. Corcoran ...	Moory loam ...	24/3/33	1 8 0	1 17 2	2 3 1
" ...	Clay loam ...	24/3/33	1 15 2	2 6 2	2 11 3
J. O'Callaghan ...	Strong clay ...	10/3/33	1 16 2	1 16 0	1 18 3
" ...	Strong loam ...	9/3/33	1 17 0	1 17 2	2 0 0
D. Coady ...	Strong moor ...	21/3/33	1 17 3	2 0 2	2 6 0
" ...	Light loam ...	18/3/33	1 9 2	1 11 2	1 15 0
P. J. Colgan ...	Heavy clay ...	25/4/33	3 10 0	3 14 2	4 2 0
" ...	Peaty soil ...	28/4/33	2 16 0	3 2 1	3 16 0
N. P. Cotter ...	Dark moor ...	29/3/33	2 17 1	3 1 2	3 2 1
" ...	Dark loam ...	27/3/33	2 15 0	2 16 1	3 0 2
M. Hession ...	Limestone loam ...	—/3/33	2 18 3	3 14 3	3 11 3
M. H. McDonagh ...	Moory soil ...	25/3/33	1 4 0	1 12 1	1 12 3
" ...	Clay loam ...	22/3/33	1 16 3	2 0 3	2 4 3
J. W. Browne ...	Medium clay ...	25/3/33	2 2 2	2 4 2	2 12 0
" ...	Peaty soil ...	25/3/33	2 1 0	2 1 2	2 8 3
P. Conroy ...	Loam ...	11/3/33	2 4 0	2 11 1	2 18 2
" ...	Peat soil ...	15/3/33	1 14 0	1 19 0	1 18 1
J. J. Hogan ...	Medium loam ...	31/3/33	2 4 3	2 4 0	2 5 2
" ...	Heavy clay loam ...	22/3/33	2 13 1	2 17 2	3 6 2
E. McGauran ...	Medium loam ...	25/3/33	2 1 0	2 6 2	2 8 0
" ...	Peaty loam ...	3/4/33	2 8 0	2 16 3	2 16 0
Average (63 centres)			2 4 3	2 5 2	2 9 0

The figures showing the average yield from the two phosphates correspond fairly closely with those obtained in previous trials.

At eleven out of 63 centres at which the trials were conducted Clare phosphate produced a bigger yield of hay than North African Mineral Phosphate, while at the remaining 52 centres it produced results inferior to the North African Mineral Phosphate.

PASTURE MANURIAL TESTS WITH CLARE PHOSPHATE.

The results of demonstrations laid down in 1926 by the Assistant Agricultural Overseers, in which Clare phosphate was compared with a number of other phosphatic manures, showed that, during the year of application and in the three subsequent years, Clare phosphate was definitely inferior as a fertiliser for pastures to all the other forms of phosphatic manures included in these trials. The soil on the plots at the few centres where Clare phosphate produced an improvement was of a peaty nature. A report on the results of these tests has already appeared in the Department's Journal, Vol. XXX, No. I.

In 1930 a further series of tests was started in which Clare phosphate, North African Mineral phosphate and Semsol were compared at over 50 centres by the Assistant Agricultural Overseers. The soil at all the centres, at which this series was conducted, was of peaty nature; and the results for the years 1930, 1931 and 1932 have already been published in the Department's Journals, Vols. XXX, No. 2, XXXI, No. 1 and XXXII, No. 1, respectively. During the past season (1933), these plots were again kept under observation, and at about 48% of the centres from which reports were received Clare phosphate failed to produce any visible result, and at about the same percentage the improvement was so slight as to be almost negligible. At one centre, however, this phosphate produced better results than either Semsol or North African Mineral phosphate, at another it gave a better return than Semsol and equal to that produced by North African Mineral phosphate, while at a third centre it produced better results than Semsol, but inferior to those of North African Mineral phosphate.

In 1933 it was decided to conduct another series of demonstrations on the manuring of pastures with the object of ascertaining the manurial value of Clare phosphate from the new seam compared with North African Mineral phosphate when used as a top-dressing for pastures. Both the Clare phosphate and the North African Mineral phosphate used in these demonstrations were part of the consignments used for the trials on Swedes and Meadow Hay conducted by the Agricultural Instructors.

These demonstrations were to be laid down at two centres by each Assistant Agricultural Overseer. It was agreed that the soil at least at one of the centres at which the demonstrations were to be carried out should be of a peaty nature, and that the manures should be applied side by side at the rate of 10 cwt. Clare Phosphate and 8 cwt. North African Mineral Phosphate per statute acre.

The demonstrations were conducted at 138 centres, and at 102 of these centres the soil was definitely of a peaty nature, and at the remaining centres the soil varied, and was described as either loamy, light and heavy clay, stiff clay, clayey, or light limestone.

The manures were applied to the pasture either in March or early April, and the plots were inspected at intervals during the Summer and Autumn. At the end of the growing season a general report on the appearance of the pastures during the year at each centre was submitted by the officers supervising the tests.

At 126 centres, out of the total of 138 from which reports were received, the North African Mineral Phosphate produced an improvement in the pasture. At 75 of these the effect was marked, while at 51 the improvement, though not so marked, was sufficient to be noticeable. In the case of the Clare Phosphate, an improvement was noticed at 80 centres out of the 138, but it was only at five of these that the improvement was marked, and as great as or greater than the improvement at the 75 centres due to the dressing of North African Mineral Phosphate. At 58 centres there was no improvement due to the application of Clare Phosphate compared with 10 centres where no improvement was noticeable as a result of the application of North African Mineral Phosphate.

At three centres Clare Phosphate produced a better result than North African Mineral Phosphate, and an improvement equal to it at two other centres; while at 121 centres North African Mineral Phosphate produced results superior to Clare Phosphate.

At the centres where Clare Phosphate produced equal or better results than North African Mineral Phosphate the soil was described as peaty at four centres, and as heavy moor in the other case.

MANURING OF PASTURE WITH PHOSPHATES IN 1931.

Numerous series of experiments on the manuring of pasture have been conducted by the Agricultural Instructors and the Assistant Agricultural Overseers during the past twelve or fourteen years, with the object of comparing the relative merits of different forms of phosphates for the improvement of pastures. These tests have not only repeatedly demonstrated the marked improvement in the quantity and quality of the herbage on the pastures as a result of such phosphatic dressings, but they have also shown that some of these manures, such as Superphosphate and Semsol, produce results more quickly though not so lasting in their effect as others, such as Basic Slag and North African Mineral Phosphate. Reports of these trials have already been published in the Department's Journals.

In a further series of pasture manurial demonstrations laid down in 1931 by the Assistant Agricultural Overseers, Semsol and North African Phosphate at the rate of 8 cwt. per statute acre were applied to plots side by side at over 200 centres.

While both manures gave satisfactory results in the year of application, Semsol produced an earlier growth of grasses and clovers at almost all centres. No improvement was noticeable at a small proportion of the centres, though the soil in these instances where these phosphates were applied was not confined to any particular type and did not appear to differ from the soil at other centres where a distinct improvement appeared as a result of the application of these manures.

During the season 1932 these plots were again kept under observation, and the good results produced in the previous season were again evident. The North African Mineral Phosphate produced comparatively better results

than in the previous year, and growth on the plots which received a top-dressing of this manure was as early as that on the plots dressed with Semsol at over 70 per cent. of these centres. At the remaining centres, though not so effective in producing a growth as early as Semsol, it was equally as effective towards the end of the season. There was little or no change in the pasture on the plots where in the previous season no improvement could be seen.

Reports on the conditions of the pasture on these plots for the season 1933—the third after application—received from over 200 centres show that the improvement due to the application of Semsol noted in the previous seasons was maintained at all centres, and that North African Mineral Phosphate was now producing growth quite as early and clovers in greater abundance at over 80 per cent. of the centres, and that the herbage on the plots dressed with both these phosphates showed a marked improvement compared with the herbage on the plots which received no manure in 1931. It was noted also that considerable improvement in the pasture was evident on the few plots where in the two seasons previous no change could be observed as a result of the dressing with either Semsol or North African Mineral Phosphate.

A further series of demonstration plots on the top-dressing of pasture land with Semsol and North African Mineral Phosphate was laid down in 1932 by the Assistant Agricultural Overseers at over 300 centres. The phosphates were applied at the rate of 8 cwt. per statute acre as in the previous trials.

Reports for the season 1932 showed that Semsol produced an earlier growth of herbage, a greater increase in clovers at about 65 per cent of the centres, and that the two manures produced an equal improvement at about 30 per cent. of the centres, while at the remaining 5 per cent. North African Mineral Phosphate effected an improvement superior to that of Semsol. At practically every centre an improvement was noticeable compared with the control plots.

The plots to which these manures were applied in 1932 were inspected periodically during the season 1933, and reports at the end of the season from all the centres indicate that Semsol continued to produce good results at over 90 per cent. of the centres. The difference between the results on the plots dressed with it and North African Mineral Phosphate was, however, not so great as in the previous season. At over 70 per cent. of the centres North African Mineral Phosphate was now producing results as early and as good as those produced by Semsol. The difference between the results from the two forms of phosphate was at the end of the season very slight. The results of these trials confirm those previously conducted, viz., that in the year of application better results are usually obtained from the use of Semsol, and that more lasting results are obtained from the use of North African Mineral Phosphate.

TRIALS WITH PHOSPHATIC MANURES ON GRASS LAND IN 1931.

It will be seen from the reports as published in the Department's Journal, Vol. XXXII, No. 1, that the Agricultural Instructors laid down manurial demonstration plots on pasture at 1,688 centres in 1931. Semsol was the only phosphatic manure used on the plots at 1,108 of these centres. North African Mineral Phosphate only at 577 centres; while both forms of

phosphate were applied side by side at three centres. The manures at the rate of 8 cwt. per statute acre were applied in all cases during the months of January or February. Later in the Spring a top-dressing of Sulphate of Ammonia at the rate of 1 cwt. per statute acre was given to half of each of the manured plots.

The reports received from the various centres in 1931 indicated that growth on the portion of the plots which received top-dressing of Sulphate of Ammonia was from four to six days earlier than on the portion which was dressed with Semsol alone, and that on this latter portion growth was from eight to twelve days earlier than on the plots to which North African Mineral Phosphate alone was applied.

In 1932 these plots, which received no additional manuring, were again kept under observation, and it was reported that the improvement noticed in the previous season due to the phosphatic dressings was again maintained, but the difference in earliness of growth due to the two phosphates was not so marked, and that North African Mineral Phosphate was now producing comparatively better results than in 1931. The early growth due to the effects of Sulphate of Ammonia noticed in the previous year now was scarcely noticeable.

With the exception of a small number of plots which were broken up and cropped in 1933, the others still remained in pasture, and observations on the appearance of the herbage on these were made from time to time during the year.

No additional manures were applied to these plots in 1933. The reports received at the end of the season indicate that both forms of phosphate continued to produce good results. Although little difference could be detected between the results from the two phosphates in 1932, it was now generally admitted that during the past season—the third after application—the improvement in the herbage on the plots dressed with North African Mineral Phosphate was greater than on the plots dressed with Semsol alone and that the Sulphate of Ammonia applied in 1931 had now ceased to produce any noticeable improvement. It was also reported that at the centres where the plots were ploughed and the ground cropped with oats, better crops were obtained on those parts of the fields where either Semsol or North African Mineral Phosphate was applied in 1931 than on the portions to which no top-dressing was applied.

DEVELOPMENT OF AN IMPROVED TYPE OF WINTER SPRAY FOR ORCHARDS.

By.

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For some years research work on winter sprays has been in progress in the Agricultural Zoology Department of University College, Dublin. The results of this research up to 1932 have already been presented in three papers published in the Journal of the Department of Agriculture.*

The present paper deals entirely with the results obtained since 1932. The earlier research had demonstrated that a better spray than an ordinary tar-distillate spray could be made by mixing a mineral oil with the tar-distillate. The principal characteristic of such a spray proved to be that it was very efficient in killing the winter eggs of the red mite or "red spider" (*Oligonychus ulmi*), and at the same time it retained all the characteristics possessed by the ordinary tar-distillate sprays.

The research outlined in this paper has had for its object the putting on the market of a reliable combination spray, containing the tar-distillate and mineral oil constituents mixed together, so that the orchard owner would only have to add water when preparing the spray for use.

Prior to the winter of 1932, a tar-distillate of known composition (supplied by Richardsons, [Dublin] Ltd.) and also two different grades of mineral lubricating oil (light and heavy), were selected for the purposes of the research.

Having given consideration to the question of preparing combination sprays from these materials, it was decided to proceed with the preparation of the following three sprays:—

- | | | | | | | |
|----|------------------|-----|----------------|-----|-----|--------------------|
| A. | Spray containing | 50% | tar-distillate | and | 25% | light mineral oil. |
| B. | " | " | 38½% | " | " | 38½% " " |
| C. | " | " | 38½% | " | " | 38½% heavy " |

The remaining constituents of each of the above sprays were the materials necessary for emulsification. Richardsons (Dublin) Ltd., the only Irish firm manufacturing a tar-distillate spray ("Killova"), kindly undertook to manufacture a small quantity of each of these sprays for the preliminary tests.

In addition to the above sprays it was decided to retest the combination spray which had been used the previous year, viz., the tar-distillate "Carbokrimp" combined with the miscible oil "Silspray" ("Sunoco").

* Journal, Department of Agriculture, Irish Free State, Vol. XXIX, No. 1, Vol. XXX, No. 1 and Vol. XXXI, No. 2.

The preliminary tests with all the sprays were carried out in the laboratory only. The tests were made by spraying apple twigs on which there were eggs of the red mite, apple sucker and aphid (all of which had been counted previous to spraying), and afterwards determining the number of these eggs which hatched. As the procedure adopted in making egg counts, etc., differed somewhat from that of previous years, it has been considered advisable to describe it in detail.

In December, 1932, a large number of egg-infested, straight apple twigs were cut from the trees in the orchard. These twigs averaged about 18 inches in length and after being cut were immediately placed in water. The task of counting the different types of eggs on these twigs was then undertaken, the procedure being as follows:—The twig taken for counting was removed from the water and the end of it was pushed into a large thimble of vaseline. The twig was then surveyed under a binocular microscope and any dense, piled up masses of eggs, which would be difficult to count, were scraped off. The eggs in deep cracks, behind buds, etc., were also removed. The remaining eggs were therefore fairly well spread out and easily visible. The counting of these eggs was done directly under the binocular microscope and was facilitated by making short longitudinal slits with a very fine sharp scalpel in the bark of the twig. There was very little difficulty in counting the number of eggs between each two of these slits. The number of red mite eggs, apple sucker eggs and aphid eggs were counted separately and tabulated. The eggs were only counted down to about 4 inches from the base of the twig. Below this point the twig was brushed clean and the portion which had been in the thimble of vaseline was cut off. The twig was then immediately placed in a wide-necked bottle of water.

When all the twigs had been dealt with in this manner they were subdivided into groups so that each group contained approximately the same number of eggs. The twigs in each group were then sprayed with the different sprays to be tested, those in the control group being sprayed with water. The spraying was done during the second week of January, 1933, and then the twigs (each standing in a bottle of water) were removed to an unheated out-building where the conditions approximated closely to out-of-door conditions.

Each week the water in the bottles was changed and the twigs were also sprayed with water (to simulate rain). All the twigs used in the experiment remained alive, and in the early spring came into good foliage. The twigs were closely watched as hatching time approached. Immediately the first sign of hatching was noticed, each twig was taken from the water; the leaves were removed and the twig was cut up with a sécateurs into pieces about three inches long. The pieces were then put into a large porcelain evaporating basin and the rim of the basin was ringed with vaseline. Over the basin was placed a glass plate so that nothing could possibly escape.

When it was judged that hatching was completed (about end of May), the counting of the mites and insects which had hatched was proceeded

with. This merely involved the removal of the glass plate and the counting under the binocular of the creatures adhering to the ring of vaseline on the plate and around the rim of the basin. The pieces of twigs were also surveyed under the binocular and any mites or insects found on them were added to those on the vaseline.

No trouble whatever, was experienced in counting the red mites and apple suckers. In the case of the aphid on the control twigs, however, it was not found possible to make an accurate count, due to the fact that many of those in the vaseline seemed to have rotted away. Also, there had been some moulting, and therefore the presence of cast skins complicated matters. In the following table therefore, a definite figure for aphid hatch on the control twigs is not given.

For each spray tested, twelve twigs were used and also twelve were kept as controls.

RESULTS OF LABORATORY EXPERIMENTS WITH DIFFERENT COMBINATION SPRAYS.

Spray used	Number of viable eggs on twigs at time of spraying	Number of eggs which hatched	Percentage hatch (approximate).
Control ..	357 aphid. 547 apple sucker. 2,663 red mite.	Many aphid. 330 apple sucker. 1,894 red mite.	High, aphid. 58 apple sucker. 71 red mite.
Tar-distillate and light mineral oil combination (A)* at 10 per cent.	359 aphid. 607 apple sucker. 3,108 red mite.	Nil aphid. 3 apple sucker. 23 red mite.	0 aphid. $\frac{1}{2}$ apple sucker. $\frac{1}{2}$ red mite.
Tar-distillate and light mineral oil combination (B)* at 10 per cent.	377 aphid. 368 apple sucker. 3,461 red mite.	Nil aphid. 1 apple sucker. 26 red mite.	0 aphid. $\frac{1}{2}$ apple sucker. $\frac{1}{2}$ red mite.
Tar-distillate and heavy mineral oil combination (C)* at 10 per cent.	344 aphid. 696 apple sucker. 3,353 red mite.	Nil aphid. 1 apple sucker. 50 red mite.	0 aphid. 0 apple sucker. $1\frac{1}{2}$ red mite.
"Carbokrimp" and "Sil Spray" combination.†	347 aphid. 922 apple sucker. 2,193 red mite.	Nil aphid. 5 apple sucker. 236 red mite.	0 aphid. $\frac{1}{2}$ apple sucker. 13 red mite.

From the foregoing table it will be seen that each of the three tar-distillate and mineral oil combination sprays gave an exceedingly good control of aphid, apple sucker and red mite. The kill of red mite eggs resulting from the use of "Carbokrimp" and "Sil Spray" was not as good as that obtained in the previous year.

Having discussed with Richardson (Dublin) Ltd., various technicalities

* Composition of sprays A, B and C is already given in text page 8.

† Diluted spray contained 6% of "Carbokrimp" and 4% of "Sil Spray."

in connection with the manufacture of the tar-distillate and mineral oil combination sprays, it was decided that spray "A" would be the most suitable for commercial use. Richardsons Ltd., decided to manufacture this spray and have since put it on the market under the trade name of "Super Killova."

1934 EXPERIMENTS WITH "SUPER KILLOVA."

It was decided that the 1934 experiments should deal exclusively with "Super Killova" (spray "A" of the previous year). These experiments were planned to test the efficiency of this spray when used at different strengths. The critical tests of this nature were carried out in the laboratory in exactly the same manner as the previous year (namely, by spraying apple twigs on which the eggs had been counted).

In addition to the laboratory tests, all the trees in the orchard (with the exception of a few left as controls) were sprayed with "Super Killova" at 8 per cent. concentration, and also, tests were carried out in the orchard to ascertain whether "Super Killova" at different concentrations would cause any bud injury.

RESULTS OF LABORATORY EXPERIMENTS WITH "SUPER KILLOVA" ON APPLE TWIGS.*

Percentage strength of "Super Killova"	Number of viable eggs on twigs at time of spraying	Number of eggs which hatched	Percentage hatch (approximate)
Control ..	59 aphids.† 2,847 apple sucker. 7,007 red mite.	35 aphids. 1,256 apple sucker. 5,148 red mite.	59 aphids. 45 apple sucker. 73 red mite.
10 per cent. ..	37 aphids.† 1,818 apple sucker. 8,127 red mite.	Nil aphids. 2 apple sucker. 159 red mite.	0 aphids. 0 apple sucker. 1.9 red mite.
8 per cent. ..	51 aphids.† 2,253 apple sucker. 6,632 red mite.	Nil aphids. Nil apple sucker. 168 red mite.	0 aphids. 0 apple sucker. 2.5 red mite.
6 per cent. ..	31 aphids.† 2,900 apple sucker. 6,477 red mite.	Nil aphids. 8 apple sucker. 306 red mite.	0 aphids. 0 apple sucker. 4.7 red mite.

From the foregoing table it will be seen that "Super Killova" gave a complete kill of aphids and apple sucker eggs at all concentrations, and gave an exceedingly high kill of red mite eggs (even at 6 per cent. concentration). It can be seen, therefore, that it will suffice to use "Super Killova" at a concentration of 8 per cent. (One volume of "Super Killova" to eleven and one half volumes of water) for orchard spraying.

* Thirteen twigs were used for each concentration of spray and also thirteen for control.

† The number of aphids eggs present was very small on all the twigs.

The results of the laboratory tests were corroborated by the orchard spraying. As has already been stated, the trees in the orchard were sprayed with "Super Killova" at 8 per cent. concentration. There was scarcely any hatch of aphid, apple sucker or red mite on these sprayed trees, while on the few unsprayed control ones there was an appreciable hatch.

In order to determine whether "Super Killova" would cause any bud injury, it was decided to carry out tests at different concentrations on small growing apple trees. Eight such trees (varieties Worcester Pearmain, Grenadier and King of Pippins, and average age 6 years), were selected in a small enclosure where no kind of winter spraying had ever previously been carried out. It was decided to test the effects of the spray at 12 per cent., 10 per cent. and 8 per cent. concentrations and to apply these concentrations to different branches of each tree. The branches of each tree, therefore, were sub-divided into 4 lots (for the three concentrations of spray and a control lot). The spray fluid was placed in a fairly wide glass cylinder about 30 inches long, and each shoot on the different branches was in turn bent over and dipped into the cylinder of spray. In this manner a complete immersion in spray of about 30 inches of each shoot was secured.

The results of the foregoing test may be briefly summarised by stating that no bud injury whatever could be detected (even on the shoots dipped in 12 per cent. spray). All the buds on all the shoots burst in a normal manner and came into full foliage (or blossom).

It is worth noting, also, that in an orchard where black currants, red currants and gooseberries were sprayed with 8 per cent. "Super Killova" during the first week of February no sign of bud injury could be detected.

SUMMARY AND GENERAL REMARKS.

As a result of some years of research, an improved type of winter spray for orchards has been developed and put on the market. This spray has been named "Super Killova." It is composed of 50 per cent. tar-distillate and 25 per cent. light mineral lubricating oil, together with the necessary emulsifying ingredients. Detailed laboratory tests and orchard spraying have proved that this spray, if used at 8 per cent. concentration, will give practically a complete kill of aphid, apple sucker and red mite eggs. Up to the present no indication of injury to dormant buds of apples and bush fruit has been noticed from the use of this spray at concentrations recommended for orchard spraying.

Opportunities have not arisen for determining whether "Super Killova" is more efficient than an ordinary tar-distillate spray in killing the winter eggs of other insects, *e.g.*, winter moths, capsid bug, etc. or whether it gives a better control of woolly aphid and other living insects. It is reasonable to suggest, however, that this spray may be superior to an ordinary tar-distillate in many respects not yet proved. Meanwhile it is definitely recommended that in all cases where red mite ("red spider") is present in an orchard "Super Killova" should be used as a winter spray instead of one of the tar-distillates.

SEVENTH INTERNATIONAL SEED TESTING CONGRESS, JULY, 1934.

Report by

H. A. LAFFERTY, F.R.C.Sc.I., Director, Seed Testing Station, Dublin.

The adoption of scientific seed testing as an aid to practical agriculture dates from the year 1867, when the first institution for the testing of seeds was established in Saxony. This close co-operation between the scientist, the farmer, and the seed merchant, was attended by such satisfactory results that within the next thirty-five years similar institutions were opened in Hungary, Switzerland, Austria, Germany, Holland and Ireland; but, owing to the absence of standardised methods in technique, the figures obtained for germination and purity tests at the various stations were of very little value for comparative purposes.

Since such tests should constitute the basis of International trade in agricultural seeds, the directors of the various stations soon realised the necessity for uniform methods of test, but no central organisation or controlling body existed which might bring about such a desirable state of affairs. In 1906, however, Prof. A. Voight took the initiative and called together, at Hamburg, the directors of several Central European stations. At this meeting, which constituted the first Seed Testing Congress, such progress was made that a second conference was held in Wageningen in 1910, but no Association was formed and no co-operative investigations or research took place in the interval between the meetings. The World War then intervened and no further advance was made until 1921 when a third conference was held at Copenhagen. Delegates from thirteen countries attended and as a result of the meeting an Association, to be known as the European Seed Testing Association, was formed, the principal aim of which was to obtain greater uniformity in respect of analysis results at the various stations.

At Copenhagen it was decided to hold the next Congress in England, and in 1924 delegates from twenty-three countries met in Cambridge and changed the name of the Association from the European to the International Seed Testing Association, the object of which was the advancement of all questions connected with the testing and judgment of seeds.

During these meetings the pressing necessity for uniformity in methods of test was constantly kept before the delegates, and at the Fifth International Congress, which was held in Rome in 1928, the earlier deliberations took concrete shape when the Research Committee presented in draft form a set of "International Rules for Seed Testing." These rules were adopted with certain reservations and the committee was asked to reconsider the points about which complete agreement could not then be reached. This the committee did, and at the Sixth Congress, which was held at Wageningen

in 1931, the pioneers of the movement and the Research Committee had the satisfaction of seeing the revised rules adopted *in toto* but still capable of further improvement.

The 1931 Congress advanced matters a stage further when it adopted a common form of International Analysis Certificate. Prior to the Wageningen Congress, every country which exported seeds adopted a technique and form of certificate to suit its own internal and domestic needs without reference to the requirements of the importing country, but the adoption of the International Rules for seed testing and a common form of analysis certificate report at once rendered a station's results intelligible to all members of the Association, and gave then a real value as a basis for International trade in agricultural seeds.

It may be stated, in passing, that since the Copenhagen Conference in 1921, the Department of Agriculture, as representing the oldest Seed Testing Station in the British Isles, has taken a keen interest in these meetings, and as a result of the activities of its representatives, who have sat on several sub-committees, it can justly claim a considerable amount of responsibility for the progress that has been made.

The Seventh International Seed Testing Congress, with which this report primarily deals, was held in Stockholm in July 1934, and was attended by delegates representing Australia, Austria, Belgium, Canada, Denmark, Finland, Germany, Great Britain, Hungary, Saorstat Eireann, Italy, Netherlands, Norway, Sweden, Switzerland, Lithuania, U.S.A., the International Seed Trade Association, The French Seed Trade Association, the English Seed Trade Association, The Italian Seed Trade Association, the Seed Trade Association of Hungary and the Swedish vegetable Seed Trade Association.

The Congress was formally opened by Mr. E. INSULANDER, Director-General of the Swedish Board of Agriculture, who welcomed the delegates on behalf of the Swedish Government, and dealt with Seed Testing as an aid to agriculture throughout the world. On the conclusion of the Director-General's address the chair was taken by Dr. J. J. L. Van Rijn, Netherlands representative at the International Institute of Agriculture, Rome, and the business of the Congress began.

During the following days twenty-five scientific papers on matters relating to seed testing were read and discussed. One of these, which dealt with the "Duration of Germination tests," was prepared by the writer of this report and outlined the results of research work carried out at the Department's station. A joint communication on "The evaluation of broken seedlings," prepared by the present writer in collaboration with Prof. S. P. Mercer, Director of the Belfast Seed Testing Station, and his assistant, Mr. P. A. Linehan, B.Ag.Sc., was also submitted. These papers suggested certain alterations in the International Rules, and the matters at issue were referred back to the Research Committee for further consideration and report.

The Congress proper, concluded with a meeting of the General Assembly at which decisions were taken on several matters raised in debate during

the earlier sessions. The question of venue for the next Congress was also discussed, and Mr. E. Brown on behalf of the North American Seed Testing Association extended an invitation to the delegates to meet in Washington. It was decided that the 1937 Congress would be held in America if general economic conditions permitted, but failing that the venue would be Zurich.

On the invitation of the Director, Prof. H. Witte, several visits were paid to the Swedish State Seed Testing Station, which is probably the most up-to-date institution of its kind in the world. The building, which was opened in 1931, has accommodation and equipment for a very large staff of analysts and is surrounded by thirty acres of farm land on which were laid out over 7,000 field control plots. There is no elaborate scheme of seed legislation in force in Sweden for the control of agricultural seeds, but certain seed firms have their seeds tested and Government inspectors seal the bags from which the samples are purported to have been taken. As a check on these merchants, the farmers who purchase the sealed bags of seed can have samples from them tested free at the Seed Testing Station, and in this way irregularities are prevented to a great extent. Where any irregularity is found the name of the merchant in question is removed from the list of "Control" firms and this has the same effect as putting the firm's name on a Black List.

After the meeting of the general assembly, a very interesting series of excursions was arranged by the organizing committee and several days were spent in the seed growing districts of Ostergotland where Red Clover, Alsylke and Timothy are the principal seed crops grown. Visits were paid to the seed fields of the Ostergotland Society of Seed Growers and to those of the National Society of Swedish Seed growers. The party spent a particularly interesting few hours as the guests of the Weibull Seed Co., Landskrona, where the breeding trials and experimental plots of cereals were most impressive. On the way to Svalöf a short visit was paid to Hilleshög, where the Sugar Beet Research station of the Swedish Sugar Co. is situated. Here explanations were given of the recent advances that have been made in the production of new varieties of Sugar Beet, one of the most interesting being the growing of parent plants under electric light which results in the saving of a year in the production of seed from such plants.

Arriving at Svalöf, the headquarters of the Swedish Seed Association and General Swedish Seed Co., the party were shown over the laboratories and experimental fields. Here a large staff of experts are engaged in plant breeding work, and as far as one could gather in the short time available each crop plant has a staff of specialists to itself. The party then proceeded to Alnarp, where a visit was paid to the seed testing station, which is a sub-station of the State institution, and attached to it are the State vegetable control fields, where hundreds of varieties of different kinds of vegetables are grown as a check on genuineness of strain, and all State sealed parcels of vegetable seeds must be "proved" by such growing trials before being placed on the market. The delegates then returned to Malmö where the Congress dissolved.

Owing to the fact that several of the delegates were travelling to their respective countries via Copenhagen, the President of the International Seed Testing Association, Mr. K. Dorph-Petersen, invited as many as possible to visit the Danish Seed Control Station and to take part in a short series of excursions which he had arranged to places of agricultural interest in Denmark. About twenty delegates accepted the invitation and were shown over the station which is situated in the centre of Copenhagen. Here the Director and his Staff explained the method of Seed Control in Denmark which follows very closely on that already mentioned as being in operation in Sweden.

A short visit was paid to the Danish Farmers' Co-operative Association for seed growing. This institution is the headquarters of 1,800 affiliated Danish Co-operative Societies and its Director and his staff are conducting breeding work from which the best yielding strains of Danish clovers and grasses are being produced.

"Faurholm" and "Trollesminde," two State experimental farms, were included in the itinerary, where improved varieties of Clover, Cocksfoot, Perennial Ryegrass, Sugar Beet and Swedes were under comparative field test. The Danish excursions finished with a visit to a private estate at Mordrupgaard where approximately 1,000 acres were under cultivation, and where the owner specialised in the production of milk (200 cows), Clover, Swede, and Grass seeds (Perennial, Brome and Cocksfoot).

The lessons to be learned from these excursions were many, but it is questionable if there is anything which strikes one more forcibly than the universal attempt which is being made in Sweden and Denmark to produce the most suitable strains of farm crops for each country. Particularly is this the case with Clovers and Grasses, and the valuable results that have accrued from this work could be clearly seen from the comparative field trials where crops from imported commercial seeds and from seeds of improved strains, which were for the most part produced by selection and crossings of native varieties, were growing side by side.

HISTORY OF POTATO VARIETIES

By

W. D. DAVIDSON, B.A., B.Sc.

The potato was cultivated for food by the natives of the North-West of South America for centuries before it was known in Europe.* Pedro de Cieza de Leon,† a Spanish soldier, recorded its existence in 1538 in the Upper Cauca valley, in what is now Columbia. Clusius‡ has left the earliest record of the occurrence of the potato on the Continent of Europe, and gave a detailed description of the tubers. They were very irregular in shape, small, numerous, and had a smooth red skin. Gerarde's§ potato, the earliest recorded in the British Isles, was a white-skinned, round to oval, irregular tuber with deep eyes, and of early maturity. These early references show that at the time the potato became known to Europeans more than one variety was in existence.

Though the potato was grown by Gerarde as early as 1596, it is rather surprising that no special reference was made to varieties until 1730. Potato historians have invariably ascribed to Miller the honour of being the first writer to refer to varieties in his *Gardener's Dictionary*, 1731; but this honour must be given to Rye, an Irish writer, who not only preceded Miller, but gave a much more detailed reference in his work, *Considerations on Agriculture*, 1730.

Miller refers only to "the red and white potatoes," which may have been types rather than varieties. Rye, however, says—

"There are five sorts of *potatoes* known to us; the white flat Kidney *Potatoe*, the round White, the Yellow, the round Red, and the Black *Potatoe*. The white *Potatoe* is set in *January*, to afford early *Potatoes* in the latter end of *June*

The round White is neglected.

The yellow *Potatoe* is valuable for keeping most part of the *Summer* following.

The round Red is a good *Potatoe*, and increases much.

But it is the black *Potatoe* (not that the Pulp is black, but that the Skin is very dark) that is most valued by those who know it; the Pulp affords a stronger invigorating Diet to the Labourer; it keeps till *Potatoes* come again Since the people of this country found the peculiar goodness of this *Potatoe* they will scarce cultivate any other. They will grow so large, as that some of them have measured four inches in diameter."

* Wight, W. F.—Origin, Introduction and Primitive Culture of the Potato.

† Chronica del Peru, 1553.

‡ Clusius, C.—Rariorum Plantarum Historia, 1601.

§ Gerarde, John—The Herball or General Historie of Plants, 1597.

The "five sorts of *potatoes*" may not have been distinct varieties, as the term, variety, is now understood. Yet, "the white flat Kidney *Potatoe*" being an early, was probably a distinct variety. Again, the "Yellow" potato was also probably a distinct variety.

In the cases of the "round White" and the "round Red," they may have been types rather than varieties. The "Yellow" potato was probably the same as that later referred to by Hale* in 1746, and described by Lawson† (1836), but has no connection with the much more recent "Brown Rock," a yellow-skinned variety once very popular and still found in isolated small patches in Ireland.

The "black *Potatoe*" mentioned by Rye was unquestionably a distinct variety which can be definitely traced for a long period. This variety must be regarded as deserving premier place in an historic collection. Unfortunately the raiser of the variety is unknown, but according to Rye's statement it was comparatively new to him at the time he wrote.

It is not possible in the limits of this article to deal more than briefly with the history of varieties, and many early references to varieties must be omitted. Many thousands of new varieties have been put on the market from time to time, and though each one generally succeeds in gaining some admirers, yet the number that achieve more than a local and temporary success is comparatively small.

The following notes deal with all or most of the outstanding varieties introduced since Rye published his short list in 1730. There is likely to be some diversity of opinion regarding the merits of modern varieties, but it is safe to state that all the older varieties mentioned were worthy of the praise bestowed upon them by contemporary writers. Possibly some old varieties that should be included have been omitted, but it is believed that at least no really meritorious ones have been overlooked.

The fact that different names have at all times been applied to the same variety, and that the same name, Snowflake for instance, has been often applied to different varieties, adds greatly to the difficulties in preparing a history of varieties. A considerable number of names has been applied to most of the important varieties, especially to such as Up-To-Date, Abundance and British Queen, which have been re-named some hundreds of times‡. The confusion resulting from this practice is now almost ended, thanks to the registration work being carried out at Ormskirk since 1915.

It is a matter of regret that it has not been found possible to discover the names of the raisers, not to speak of the parentage, of many of the most important varieties. Findlay§, a famous raiser, stated: "I would not give a farthing for any potato if I could not trace its descent from the Victoria."

* Hale, Thomas—A Compleat Body of Husbandry, 1756 (written 1746).

† Lawson, Peter and Son—The Agriculturist's Manual, 1836.

‡ See Salaman,—Potato Varieties, 1926.

§ Findlay, Archibald—The Potato; Its History and Culture, 1905.

Findlay, however, was generally able to discover suitable ancestry for his favourite varieties. For example: In the same work he states that Champion was a "direct descendant" from Victoria, whereas Nichol, who raised the Champion, in his evidence before a Select Committee of the House of Commons said: "I really do not remember the names of the potatoes I planted." Another statement of Findlay's made in 1893 at a demonstration at Pitillock was that the Up-To-Date was "a cross of the old Victoria with a seedling of the old Blue Don." Yet, in a paper read before the Glasgow Discussion Society, January 1905, when speaking of Up-To-Date, he said: "no man, woman or child beyond myself ever knew how it was bred... one of its parents was never sent out by me."

Salaman,* writing of Paterson's Victoria, more or less supports Findlay when he states: "it may be said that practically no potato to-day of any outstanding merit is without the blood—though far removed—of this variety (Victoria)." No facts are available to support this opinion, and equal importance might just as well be attributed to Early Rose or Regent. It must suffice here to say that whatever evidence exists points to the fact that all the most outstanding varieties were obtained more or less by accident.

The Black Potato mentioned by Rye in 1730 must be regarded as the first really outstanding variety. Rye praises it highly, especially as a good keeper. Many later writers also refer to its good keeping qualities. Howden recommended it for spring use in 1837, more than a century after its introduction. Dubourdien refers to it as being the popular variety for many years in Co. Antrim.

It was mentioned in the following County Statistical Surveys, published 1795–1824:—Antrim, Armagh, Clare, Down, Galway, Meath, Perth, Fife, Northumberland, Cheshire, Isle of Man, etc. The Black Potato was known in some districts under such names as the *Irish Black Potatoe*, *Irish Blue Potatoe*, *Old rough Black*, *Black-a-Moor*, *Scotch* or *Old Black*, *The Sweep*.

The tuber was described by one writer† as having the "outer coat sooty colour, but when rubbed off, raw potatoe is bright purple." Another writer‡ said that the flesh was yellow. Lawson says: "It has been long in partial cultivation, and is chiefly valuable from being in season for using between the periods of planting and taking up the new crop,"—the virtue ascribed to it by Rye more than one hundred years earlier.

It is not heard of after the disastrous attack of blight in 1846.

The YELLOW POTATO, mildly praised by Rye, was highly spoken of by Hale; and Arthur Young, in his *Irish Tour* in County Kilkenny, says: "The best sort are the yellow potatoe." It appears in Lawson's list, but is not heard of afterwards. It is not correct to state that the Brown Rock of comparatively recent date is synonymous with this very old variety.

* Salaman, R. N.—*Potato Varieties*, 1926.

† Robertson, James—*General View of the Agriculture in the county of Perth*, 1799.

‡ Hayes, Samuel, Avondale, Co. Wicklow in *Report of the Committee of the Board of Agriculture concerning the Culture and Use of Potatoes*, 1795.

The next outstanding variety that made its appearance was the HOWARD or CLUSTER. The name "Howard" was given to it from its having been first brought into notice by John Howard, Cardington, Bedfordshire.

In the *Gentleman's Magazine* for 1771 there is addressed to the Society of Arts in London a memoir on a new potato by Howard, famous as prison philanthropist, traveller, scientific observer, and a man of determined accuracy. Six years previously he had planted a new potato fresh from America.

Holt, in his *General View of the Agriculture of Lancaster*, 1795, says :

"The Cluster or Conglomerated, or Suffolk (for so it is called by Mr. Howard, who first introduced it to notice) was cultivated in this county twenty-five years ago from sets left by that gentleman with the Society for the Promotion of Arts and Commerce."

The name "Cluster" was derived from the fashion in which the tubers grew close round the stalk. This variety was very extensively grown in Great Britain and Ireland, especially for stock-feeding. In its travels it assumed various titles, such as those already mentioned, and Buckinghamshire Potato, Surinam (a name also applied to Yam), Hog Potatoes, Bulls and Bucks, The Turk, Bedford, Bedfordshire, Red Bunch Hog Potato, Horse-legs, etc. It was recommended for cattle and pigs by almost every writer on potatoes between 1773 and 1840. Its yield was abnormally heavy.

Arthur Young, in his *Irish Tour*, says : "The Turk, which is the English Howard, they plant on poor land, and never bestow any dung on it, yet get great crops."

The IRISH APPLE was the next outstanding variety to make its appearance. Too much could not be said in praise of this wonderful potato. It is first referred to by John Wynn Baker, who obtained a barrel of them to plant in the Spring of 1770. In his report of the crop to the Dublin Society he said : "We have only three pounds of small ones out of four stone ten pounds, which is only one twenty-second part; a circumstance which makes me think very highly of this potatoe." In Spring, Baker boiled some to get his workers' opinion on their quality. "When I went to the boys," he says, "to ask them which they liked best, one of them who is, and I believe ever will be a slovenly fellow, was powdered from the chin to the waist, as if meal had been thrown upon him, by his breaking the potatoes he ate of, and letting them crumble upon his cloaths; this is a striking proof of their prodigious dryness."

The tuber was a white round, with bright light red about the eyes. The variety was famous as a good keeper, and for its stalks remaining green long after all the other kinds had withered. This variety was recommended by Howden,* and by practically every writer as late as 1840. It did not survive the attack of blight in 1846.

* Howden, Andrew—Essay on the comparative value of different varieties of the Potato. Trans. Highland and Agr. Soc., Scotland, 1837.

Rham, in his *Dictionary of the Farm*, 1844, says the Apple was "cultivated successively during sixty-five years without failure." On the market it generally realised 20 to 50 per cent more than other varieties.

Dublin market prices, February, 1835 :—

Apples.	Per cwt.	..	..	..	2 2½ to 2 5
Cups.	"	..	..	..	1, 5½ to 1, 7
Pink Eyes.	"	..	..	..	1, 8½ to 1, 10½

In the county of Devon in 1808, "when the Ox-Noble sells for eighteen pence a bushel, the Irish Apple will sell for half-a-crown."*

This variety spread practically to every district in Great Britain and Ireland. Like all varieties, however, it eventually degenerated. Murphy,† in 1834, says of it : "The Apple—the king of potatoes at one time—is fast hastening to decay." However, it survived to a considerable extent until 1846, when the blight swept it and almost all varieties, except the Regent, out of existence.

The RED-NOSED KIDNEY was the next variety of importance to appear, and its origin is also unknown. It was a long time in cultivation before any reference to it could be discovered. In *Annals of Agriculture*, Vol. 2, it is stated : "At Ilford, in 1784, the Red-nose Kidney laid aside, because sure to be curled." Young makes practically the same remark in his *Survey of Essex*, 1807.

George Newenham, in a letter to the *Munster Farmers' Magazine*, 1812, describes how he selected a tuber "marked by nature in a peculiar manner, and I prized it from that circumstance alone, as giving me the power of knowing it from other kinds. I therefore took every means to increase it : it proved excellent for the table, very productive, and suitable to plant as a middle crop, being at a state of maturity in July, and perfectly good for use so late as May following. I gave the seed away to numerous acquaintances, and now at the end of twenty years it passes in the counties of Cork, Limerick, Tipperary and Kildare by the name (improperly) of the Red-Nose Kidney. It is of a kidney shape, the broad end quite purple, and every eye appears like a purple spot."

This variety was, however, probably long in cultivation before it was noticed by Newenham. It was grown very extensively in County Dublin under the name of *Wicklow Banger*. It was also known as *Red Nebs* and *Early Bangers*. Writers as far apart as Dublin, Cork, Wexford, Aberdeen, Northumberland and Cornwall refer to it.

This was one of the most famous varieties of its period, and was cultivated extensively from at least as early as 1775 until 1820, and was even grown on a commercial scale as late as 1840.

The MANLY was one of the first very famous early varieties, and is mentioned‡ in 1776. It was then a well-known variety. It was recommended as late as 1859, so that it had an exceptionally long life. The tuber was

* Vancouver, Charles—General View of the Agriculture of the County of Devon 1808.

† Murphy, Mr.—Irish Farmer's and Gardener's Magazine, July 1834.

‡ Letter I. to Manchester Agr. Soc. See Bath and West Papers, Vol. I, p. 236.

large, round, with a smooth white skin. Loudon,* as late as 1842, refers to it as probably the most profitable early potato that can be grown. It was recommended by Kirkpatrick† in 1796, in the *Horticultural Register*, 1833, and by Thompson‡ in 1859.

Davies, in his *Agricultural Survey of South Wales*, 1815, says: "Manly potatoe, so called from the name of the person who raised it from seed; an excellent sort, and considering its earliness, productive." This variety has also been called Manley, White Manley, Early Manly.

"*Solanum Tuberosum*," writing in the *Horticultural Register*, Volume II., 1833, says: "For general early production, I know of none better than the the Early Manly, Goldfinder and Ash-leaved Kidney. For a good full crop, the Early Shaw is an excellent potatoe, coming in about a fortnight after the others. Next follows the Early Champion, an excellent potatoe, retaining its properties through the winter months."

OX NOBLE was the next outstanding variety to appear. Sir Thomas Beevor§ had this variety in a test in 1787 when it gave an excellent yield, but was found to be large, white and ill-flavoured. The tubers were slightly oblong and flattened, rather waxy and apt to be hollow. It was grown chiefly for stock-feeding. Many writers comment on the fact that it was very prolific and never found to present the slightest appearance of curl or other diseases. It is frequently mentioned in the English County Surveys published about 1800, and in several of the Irish Surveys, though it does not appear to have been so extensively cultivated in Ireland as the Howard or Cluster potato. The origin of this variety is not known.

The *Black*, *Apple*, *Cluster*, *Manly* and *Ox Noble* were the five outstanding varieties of the eighteenth century.

The EARLY CHAMPION appeared about the same time as the Ox Noble. It too was tested by Sir Thomas Beevor in 1787. The tuber was described by him as being "middle-sized, white, mealy and exceeding good to eat." The shape was round; eyes few, small and deep. In his *Essex Survey*, 1807, Young says: "The Champion is now very generally preferred which does not curl." Loudon,** in 1831, says: "The most generally cultivated round London, it is a very prolific, hardy and mealy." In the *Annals of Agriculture*, Vol. 7, page 40, it is stated: "Champions early, never curl, but not a great produce." It is significant that in reference to these outstanding varieties, the remark that they "never curl" is so often made.

The well-known variety YAM was referred to by Somerville of Haddington in 1795, and it was evidently pretty well known at that time. It was recommended only for stock-feeding on account of its harshness of taste. The tuber was large and oblong with a dull pink skin. This variety appears in Lawson's list in the *Agriculturist's Manual*. From the description given by Lawson it appears pretty definite that this was the same Yam as is still

* Loudon, J. C.—The Suburban Horticulturist, 1842.

† Kirkpatrick, H.—An account of the manner in which potatoes are cultivated, etc., in the Counties of Lancaster and Chester, 1859.

‡ Thompson, Robert—The Gardener's Assistant, 1859.

§ Beevor, Sir Thomas—Bath and West of England Papers on Agriculture, Vol. I 4.

** Loudon, J. C.—An Encyclopaedia of Agriculture, 1831.

grown in some isolated areas, and occurred fairly frequently as a rogue in some stocks of Kerr's Pink. "J. D.," writing in the *Farmers' Magazine*, May, 1839, says: "The Yam variety, streaked inside, was much cultivated at one time for feeding livestock; it is now much discontinued, the quality being so very bad, though the produce was immense."

This variety, though cultivated widely and for so long a period, was not so useful as some of those already mentioned. It has been renamed *Surinam*, *Bucks* and *Horse Potatoe*.

The famous variety **PINK EYES** was some time in cultivation before Holt speaks of it in his *Agricultural Survey of Lancashire*, 1795. Dr. Singer, in the *Dumfries Survey*, 1812, says: "In many districts there is a white and red called Pink-Eyes."

The variety was mentioned by Hely Dutton in the *Agricultural Survey of Galway*, 1824, and it is remarkable that the same variety is still grown in isolated places in that county, and indeed was extensively grown in the Arran Islands, Galway Bay, until comparatively recently. About 1830 this variety was cultivated almost universally in North Wales*.

The tuber was illustrated in a drawing by Niven in his prize essay submitted to the Royal Dublin Society, 1835. The variety appears in Lawson's list in the *Agriculturist's Manual*, 1836.

CORK RED was grown pretty extensively in Ireland about 1800, and apparently the same variety was grown under the name of **ENGLISH RED**.† The variety was mentioned by Coote in the *Agricultural Survey of Armagh*, 1804, and again by Hely Dutton in his *Galway Survey*, 1824. Lawson describes it in his *Agriculturist's Manual* and again in his *Vegetable Products of Scotland*, 1852.

The **PERTSHIRE RED**, or **SCOTCH RED**, along with the York Reds, were the principal varieties on the London markets from about 1830 till about 1846, when Regents became the most popular variety.

Lawson states‡ that "there are three varieties of the Perthshire Red, viz., the True or Oblong Flat, the Small-eyed Round and the Large Deep-eyed. The Oblong Flat variety was formerly distinguished by the names of Shanual or Red Coventry from having been first sent to Perthshire in 1805, by the late Dr. Coventry to Mr. Gorrie, then at Meiklour House. The origin of the Small-eyed Round variety is not known; it is about equal to the first in quality, but rather deficient in produce. The Large Deep-eyed variety which, although rather deficient in quality, is the strongest grower and most productive, may probably have been introduced from Fife, as it appears to be the same as a specimen under the name of Fife Red, received from Cupar, Fife. In Perthshire these three are now cultivated promiscuously under the names of Common, Scotch, or Perthshire Reds, the latter of which has been applied since they became so much esteemed in the London markets."

* "Gardener's Magazine," Vol. 7, p. 249, 1831.

† Trans. Dublin Society, Vol. II, Part I, p. 27.

‡ Vegetable Products of Scotland.

LUMPER, one of the most famous varieties in history, was first mentioned by Hely Dutton in his *Agricultural Survey of County Clare* in 1808. It appeared to be well known then, although it is not mentioned in the Report published by the Board of Agriculture in 1795. There are endless references to this variety, but only a few can be given. In the *Agricultural Survey, Co. Galway*, 1824, it is stated: "Lumpers are much used as they are more productive . . . than any other kind . . . quality very bad."

Lumpers were one of three varieties recommended by Howden* for stock-feeding, and considered preferable to all others on account of yield. This was no small achievement, as Howden endeavoured to procure everything worth having, and tested over 130 varieties. He says: "The Lumpers and the Cups are valuable and safe to grow for cattle, because they cover the ground well in, do not curl, and produce great weights." Note here again the remark, "they do not curl."

"By the year 1838 the cultivation of 'Lumpers' was universal in Ireland."† "Grown exclusively for their own use by the poor in 1845 (in Ireland), Lumpers suffered more than any other variety (from blight)."‡

David Ferguson, writing in the *Farmers' Magazine*, Sept., 1853, says: "I can trace the history of this kind of potato back to the year 1818, and I am told that from 1825 to 1835 it was so charged with vitality that it would grow without manure in any soil, of large size, and producing 160 barrels to the acre, but of a quality more fit for cattle than for man. Then was the time to take seeds from its apples, and have the young rising into strength for cattle, and the old losing strength but becoming more dry and floury for man's use . . . they now blossom, but cannot grow apples."

This writer is probably the first to remark that as a variety loses vigour it becomes "more dry and floury." This is a most interesting question, but definite proof for or against the opinion has never been forthcoming. There is a more or less unanimous opinion that Arran Banner—the greatest cropper of the present day—is not growing so coarse as it did seven years ago when first introduced, and that it has become more dry and floury. Lumpers were quoted in the Dublin market in 1848 at 3/-, when Apples were quoted at 5/- per cwt.

The failure of Lumper, the greatest cropper of its time, due to the severe attack of potato blight in 1846, caused the famine in Ireland and all the woeful desolation that followed in its train. Small areas of this variety are still cultivated in Ireland, which shows how well the soil and climate of the country suits the potato, when a variety can retain its vigour for such a long period. There is no doubt whatever that this is the same variety as was grown over 126 years ago in County Clare.

Cups were to the rich what the Lumper was to the poor in Ireland between 1810 and 1846. Cups were also grown in Great Britain, but scarcely to the same extent as in Ireland. Cups, like Lumper, were first mentioned

* Howden, Andrew—Report of Experiments on the comparative value of different varieties of the Potato. Trans. H. and A. S. of Scotland, Vol. XI, 1837.

† Drummond's Railway Commission Second Report, p. 81.

‡ Tate's Edinburgh Magazine, December 1845, p. 762.

in 1808, when they were pretty well known; yet they were not mentioned in the Report of the Board of Agriculture, 1795. In the *County Clare Survey*, 1808, Hely Dutton says there are "more Cups planted than of any other kind; they are reckoned not only more productive but vastly more nutritive, being more difficult of digestion, and as the country people say, 'they stay longer in the belly.'" Several writers mention that "they stay long in the stomach."

They were not found to be as productive as the Lumper, but were of much better quality; hence they were grown largely for human use by the better-off. "The Cups disappeared as a field crop in England about 1850."* The blight of 1846 practically ended the Cups, though quoted in the Dublin Market for some years after. They may be classed as one of the great varieties of history. Two old types of Cups still survive in parts of Ireland, and are famed for quality. One is known as *Red Cup* and is probably the same variety as that grown before the famine. The other is known as *Gregor Cup* also a very old variety, so far of unknown origin.

The ASHLEAF is another very famous historical variety. From 1814, when it was first recommended by Sir John Sinclair, down to about 1870, and even later, practically every writer recommended Ashleaf as the only very early variety suitable for forcing. It was the outstanding 'early' during that period. The name "Ashleaf" was given on account of the peculiar shape of the leaflets, which have a characteristic twist and a peculiar wavy edge.

In the *Gardener's Chronicle*, 1844, page 462, a statement is made that the Ashleaved Kidney was raised by Holbery, a shoemaker, at Retford, Nottinghamshire, about 40 years ago from seed of the Mouse Kidney. This is not a very reliable statement as it was not made until forty years after the event. The variety was, however, raised about the time stated, viz. 1804, as it was recommended in 1814. It is not mentioned in the Report of the Board of Agriculture, 1795, nor is it included in a list of 23 early varieties given in *Rural Recreations*, 1802. In the *Gardener's Magazine*, 1828, reference is made to the "small, early, ash-leaved kidney grown by Mr. Knight," and in 1829, the "ash-leaved kidney" was, according to another writer, "most generally approved of."†

In 1836, Lawson described it as a non-flowerer, and another writer in the *Journal of Horticulture*, May 19th, 1887, also states that it is a non-flowerer. All references describe it as having very dwarf foliage. Such is not the case with Myatt's Ashleaf which bears an abundance of bloom and fairly tall foliage. In consequence it is quite certain that Myatt's, which is the Ashleaf of the present day, is not the same as the original Ashleaf, and it is not correct to say that this variety has been 150 years in cultivation.

Myatt‡ himself in 1873 speaks of the Old Ashleaf Kidney and of "my

* Morton, John C.: *Cyclopedia of Agriculture*, Vol. II, 1856.

† *Gardener's Magazine*, Vol. VI, p. 60, 1829.

‡ Myatt, James: *Journal R.A.S.E.*, 2nd Series, Vol. 10, Part II, p. 506, 1874.

Prolific Ashleaf." He says that the Old Ashleaf takes blight very readily, but that his Ashleaf "resists it well, its top being of a hard woody nature." Myatt claims his Ashleaf to be "the best resister I have grown, and after 20 years is universally acknowledged to be so."

According to Myatt's statement, his Ashleaf would have been raised about 1853, so that although it is a much later variety than Lumper, Cups, Pink Eyes and even Rocks, yet as none of these, although grown, can now be regarded as being in commerce, it is probably true to say that Myatt's Ashleaf is the oldest variety now grown on a commercial scale. The area is, however, very small.

At the Fourth International Potato Exhibition held at the Crystal Palace on the 24th and 25th September, 1878, the following dishes were shown :—*

	Number of dishes			
Ashleaf, Myatt's	17
„ Old	6
„ Royal	15
„ Purple	14
„ Red	2
„ Veitch's	3

In the *Farmer's Magazine*, February, 1867, page 122, it is stated that "River's Royal Ashleaf and Myatt's Prolific Ashleaf, both first-rate as regards produce and quality, and with very little difference except in the haulm, in which there is a trifling dissimilarity." It may be taken for granted in this case that Myatt's was renamed, and it has also been found impossible to discover any distinguishing features between Myatt's and Veitch's Ashleaf.

The same number of the *Farmer's Magazine* states : "Red Ashleaf in all respects an excellent potato and very early." As Myatt's Ashleaf has a deep purple bud, it is quite possible that a sport with a completely purple tuber might have sprung from it. This occurred in the case of Nichol's Champion, but there is no proof that this has actually occurred in the case of Ashleaf.

There are at least three cases known to the writer of pink-skinned varieties producing sports with a purple skin. The Red potato produced such a sport, Kerr's Pink has done so, and also King Edward. The writer cannot quote a case of the reverse process, viz., a purple-skinned variety becoming pink. Whether such an occurrence took place with the Ashleaf is not known.

About the same time as the Ashleaf, another variety, the *Don*, also known as the *Edinburgh Don*, made its appearance. This variety was in all probability introduced before the Ashleaf, but no reference to it can be found until 1812, when Sir John Sinclair† records that it is the principal potato sold in the Edinburgh Market through the winter and spring months.

* Pink, James : Potatoes ; How to grow and show them.

† Sinclair's Report of the Agricultural State of Scotland, Vol II, p 83

In 1836, Lawson strongly recommends this variety. The tuber, according to him, was round and the skin white, reddish purple about the eyes.

There was also a *Blue Don* which was much esteemed in some parts of Ireland. The *Blue Don* was no doubt a sport from the *Common Don*. According to Lawson* the *Common Don* is more extensively cultivated in 1836 in Mid-Lothian and adjacent districts than any other.

In Co. Meath in 1876, Scotch Dons are the principal potatoes grown by the farmers.

SHAW'S EARLY, or as it is more frequently called, Early Shaw, was in cultivation a considerable time before any reference to it can be discovered. It was recommended as one of the best early potatoes for general field culture by Loudon in 1831, though he says it is not so extensively grown as the *Early Champion*. It was strongly recommended by Lawson in 1836.* His description of the tuber was "large, irregular, round, with a very rough dull white skin." Towers in the *Quarterly Journal of Agriculture*, †describing the *Early Shaw*, says: "Its skin is of pale buff, covered with a rough, russety membrane; and herein it differs from the *Champion*." M'Intosh in his *Book of the Garden*, 1855, says "Early Shaw or Shaw's Early, a variety grown extensively by the London market-gardeners for forcing to come to market in May. It is, for an early sort, a large, beautiful, oblong white-skinned potato, whose only fault is its hollow eyes." "It is very productive; buds early, this is the only complaint which can be advanced against that truly excellent and widely cultivated potato—the *Early Shaw*."‡ This variety is mentioned in the catalogue of Messrs. Sutton & Sons, Reading, 1852, and described as "oblong in shape, second early." This variety occupied a prominent place in the London market during the forties, and continued on even into the seventies.

FOX'S SEEDLING must also have been a considerable time in commerce before any reference to it can be found. It was recommended in the *Gardener's and Forester's Record*, June 1834, but it was certainly some time then in cultivation. Fox's *Early Delight* and Fox's *Early Globe* are described by Lawson, but whether either of these was Fox's Seedling it is not possible to ascertain. Loudon in his *Suburban Horticulturist*, 1842, recommends it along with *Early Manly* as being very prolific and of excellent quality.

In *Cottage Gardening*, July 3, 1851, Fox's Seedling is described as "round, white, short-stemmed and good for early cropping." Thompson recommends it in his *Gardener's Assistant*, 1859. T. B. W. in a small pamphlet, *Cottage Gardening*, published 1868 says: "Thirty years ago, almost the only potatoes heard of in some parts of the country were 'Farmer's Glory' and 'Fox's Seedling'—both well worth growing at the present day."

FORTYFOLD, a well known variety for the past 100 years, appeared before 1836. It was included in Lawson's list as Taylor's *Fortyfold*. In the

* Lawson, Peter and Son: *The Agriculturist's Manual*, 1836.

† Quoted in *Farmer's Magazine*, March 1839.

‡ *Farmer's Magazine*, March 1839.

Gardener's Chronicle, 1841, page 814, it is stated that the Fortyfold was a native of Lancashire, raised from two red tubers accidentally produced by a plant of Kemp's which is a white potato. They were taken to Mr. Taylor, nurseryman, of Preston, who raised stock from them. The story of its origin is not very convincing, but it was in all probability introduced by Taylor. The tuber is described by Lawson as "oval, much flattened with a rough and dull reddish skin. There is no reason to doubt that this is the same variety that is still in cultivation in small patches. It was never regarded as a very important variety, but was always comparatively well known.

Three of the most outstanding varieties in history made their appearance either in the late thirties or early forties, but little is known regarding their origin. Probably the first of the three to appear was the REGENT. This variety is not mentioned in Lawson's list, 1836, nor was it among the varieties tested by Howden, 1837. Under the name Prince Regents, it was quoted in the London Market for the first time, March 29th, 1841,* grown on warp land, 70/- per ton. On April 26th it was quoted as Yorkshire Prince Regents at 50/- to 60/- per ton as compared with 80/- to 90/- for Yorkshire Reds and 50/- to 65/- for Scotch Reds. It retained the name of Prince Regents until 1846, when it had become the most popular variety in the London Market. The name was then shortened and prefixed by the name of the district in which the potatoes were grown. The *Farmer's Magazine* quotations for November, 1846 were, York Regents 140/- to 160/-, Kent and Essex Regents 140/- to 180/-, Lincolnshire Regents 130/- to 140/- per ton. Lawson† in 1852 describes Prince Regent as "the commonest white potato in the Scotch Market, similar as to quality, but rounder in shape, than the Peffermill Prolific." Crews,‡ speaking of York Regent, says: "With many growers this variety receives much favour. Though its quality when cooked is oftentimes declared to be slightly inferior, yet as a popular market sort, which can almost be grown anywhere, it is somewhat extensively grown. The true kind has a rough skin at one end like scales; it can therefore be easily judged as to whether the buyer has purchased the right sort for cultivation. Many so-called 'York Regents' possess a smooth skin (like 'Dalmahoy')". Mr. Elliot commented upon Regents as "coarse-skinned, deep-eyed."

Lee,** speaking of the period about 1840, says: "Regents had then come into notice, and were talked about very favourably". In the *Cottage Gardener*, 1851, a writer says "York Regents are rather late, but excellent potatoes". So far as main crops are concerned, Regents practically dominated the London Market until 1860.

* *Farmer's Magazine*, April, 1841.

† *Vegetable Products of Scotland*, 1852.

‡ *The Potato and its cultivation*.

§ *The Woburn Experiments in "Potato Disease," Jour. R.A.S.E.*, 31 Dec., 1892.

** Lee, Thomas: *Potatoes, Potato Salesmen, Potato Markets, Past and Present*, 1889.

The FLUKE, another very famous variety, is supposed to have been raised in 1841, the year in which Regents were first quoted on the London Market. In the *Gardener's Chronicle* 27th February, 1858, the origin of the Fluke is described thus: "John Turner, a hand loom weaver and occasional farm labourer of Birch near Middleton in Lancashire, first raised the Fluke from a seed apple taken indiscriminately from a field of potatoes on Langley Hall farm in 1841. He never made any money out of it, but in 1852 a public subscription for him realised £152. Turner never knew the variety he took the seed from." Flukes were not quoted on the London Market until 1860* though they must have been known there before that year.

The story of the origin of the Fluke as given in the *Gardener's Chronicle* is confirmed to a considerable extent by Lee†, who states: "1855-6 were very prolific years, with little or no blight, so that all sorts ruled at low prices. At this time that excellent potato, the 'Fluke' came into prominence. It was raised at Middleton, some four miles from Manchester, and here it was grown in fair quantities. It soon acquired a great reputation and was looked after for seed purposes by growers in England and Scotland. At this time we resided within a few miles of Middleton, and when potatoes were ready for raising, I was sent to buy all the Flukes I could find. I bought all there were at Hopwood Hall, of the agent of Captain Hopwood, and also the next few days I managed to secure nearly all they had in the locality. The aggregate was some 400 tons and I gave from 7/- to 8/- per load of eighteen stone for them. In a fortnight's time buyers from many places were running through the country looking for Flukes, and in a month after I had made my purchases they rose to 18/- per load. We sent ours to Yorkshire and Scotland for seed, and they turned out unusually prolific, and they sustained a great reputation for many years, both for quality and cropping, and for being less susceptible to disease than all other sorts then in existence. The Fluke was christened the 'Farmer's Friend.'"

It is worth noting that Lee says: "the Fluke was less susceptible to disease than all other sorts then in existence." About thirty years later a writer in the *Journal of Horticulture*, May 12th, 1887, says: "The most striking instance that occurs to me on the degeneration of Potatoes is the case of the once popular and profitable variety, the Fluke." Another writer in the same magazine, 26th May, 1887, says: "This Fluke about a quarter of a century ago, was of the greatest value for baking purposes; in fact no other sort then and since cultivated was at all equal to it in that respect, and it also kept and boiled splendidly. But what about its one great weakness—viz., extreme liability to disease! I have seen cartloads of the grandest tubers of this variety all very badly diseased, the whole crop really succumbing." The Fluke probably received its name from the fact that the raiser secured it by chance. It must be classed among the great varieties though it never held the position in Ireland that it secured in Great Britain, the Rock securing preference in Ireland.

* Farmer's Magazine, January, 1860.

† Lee, Thomas: Potatoes, Potato Salesmen, etc., 1889.

THE ROCK, which was undoubtedly the greatest variety in Ireland from the time that the blight brought about almost the complete disappearance of the Lumper and the Cup until the advent of the Champion, has its origin buried in obscurity. The name Rocks was included in Howden's list of varieties in 1837, but it is not likely that this was the same variety as became famous twenty years later. This variety was very extensively grown both in Great Britain and Ireland. On August 18th, 1865, a correspondent in the *Farmer's Magazine* for September, speaking of the potato blight, states that: "There is scarcely a healthy plant of Regents to be seen. Of Flukes the appearance is much better... On the farther side of the field stands a plot of a new variety of Red Regents scarcely affected at all; and adjoining are three acres of Dalmahoy's, which are partially touched. In another field of twelve acres, a short distance off, are planted about eight acres of Rocks, one acre of Regents, one acre of Flukes, one acre of Red Regents, and one acre of Skerry Blues. The Rocks have all gone, or nearly so, the Regents still tolerably free, the Flukes only just showing a few decaying leaves, the Red Regents are nearly free, but the Skerry Blues do not show any signs of decay whatever."

Another writer in the *Farmer's Magazine*, December, 1865, mentions having ten acres, all Rocks. From 1860 until 1872 when Victorias came on, the only main-crop varieties on the London Market, were Regents, Flukes and Rocks. In January 1872 the prices quoted in the *Farmer's Magazine* were:—

Flukes	..	105/- to 135/-	per ton
Regents	..	70/- to 120/-	„
Rocks	..	85/- to 95/-	„
Victorias	..	110/- to 125/-	„

As well as the ordinary White Rock there were two sports from it, one known as the Brown Rock and the other as the Red Rock. All three are still cultivated in small patches in Ireland. In all cases the foliage is similar except that more colouring is developed in the foliage of Red Rock.

The acreage of each variety of potato grown in Ireland was first recorded in 1880, following the disastrous failure of all varieties except Champion and Magnum Bonum in 1879.

In 1880 the acreage under Rocks, White, Red and Brown, and its synonyms *Scotch Downs** and *Green Tops*, amounted to 332,200 acres out of a total of 820,651 acres, or about 40 per cent. of the total. This area subsequently decreased very rapidly as Champion became almost universal. However, for a period of more than 20 years Rocks were very extensively grown, and must be classed as one of the great varieties.

On account of the remarkable virulence of the potato disease in 1872, a series of questions on the cultivation of the potato, with special reference to the potato disease, was addressed by the Royal Agricultural Society

* See Report from the Select Committee on Potato Crop ordered by the House of Commons to be presented 9th July, 1880, p. 46.

of England to growers. The replies, including six from Ireland, were summarized by the Secretary. The following table is interesting in connection with this article :—

Varieties Grown	Number of Growers who report on each sort	Considered least liable to disease by
American Reds	1	1
American Rose	6	1
Arrowsmith	1	1
Baron's Perfection	4	4
Belgium Kidney	1	1
Bonnie Snowball	1	—
Captain White's Seconds	1	—
Dalmahoy	24	5
Faleroes	4	—
Flukes	26	5
Fox's Seedlings	3	1
Glenburgs	1	—
Lapstones	4	—
Leather Coats	3	2
Myatt's Early Kidney	25	11
Paterson's Victoria	57	21
Pink-Eyed Radicals	3	—
Protestants (Rocks)	1	1
Red-skin Flour Balls	8	4
Regents	66	10
Rocks	54	19
Rough White	2	1
Runcorn Kidneys	1	1
Russian Balls	2	2
Seedling Fluke	1	1
Shaw's	5	1
Skerry Blues	20	15
Walker's Regents	6	1
White Kemp	9	—

The foregoing table gives an idea of the relative importance of the different varieties in 1873.

KEMPS, while not among the most prominent varieties, cannot be passed over. Kemps were quoted in the Liverpool Market in 1846, and as the table just quoted shows, they were grown to some extent in 1873. This was the only early variety recommended by Baldwin in his little book, *Practical Farming*, 1877. It was very extensively grown at one time for the Dublin Market.

The LAPSTONE was said to have been raised by a Yorkshire cobbler, hence the name, but the date of introduction is not known. Charles M'Intosh in the *Book of the Garden*, 1855 says: "Lapstone kidney—decidedly the best kidney-potato grown; an excellent cropper; tubers sometimes 7 inches in length and 3 in breadth. It is a first-rate potato for the table in August and September, and will keep in excellent condition till May following, without losing either its mealiness or flavour."

Though the foregoing is the earliest reference to this variety that has been found, it was certainly in cultivation for a few years before 1855.

Thompson in the *Gardener's Assistant*, 1859, recommends it, though he was not correct in classifying it as a main-crop. In the *Journal of Horticulture and Cottage Gardener*, March 17th, 1863, J. Choyce, Junr., an exhibitor of potatoes, says: "Lapstone kidney—Second Early; a very handsome tuber, splendid eating, but shy cropper, and very much inclined to take the disease." Glenny in the *Gardener's Every-Day Book*, 1858, recommends the Lapstone as being one of the best varieties. W. Iggulden, writing in the *Journal of Horticulture and Cottage Gardener*, April 28th, 1887, says, "Mr. Laxton is of opinion that yellow-fleshed varieties including Myatt's Ashleaf, Lapstone and Scotch Champion, contain more nutriment than most other sorts, and there is no doubt in my mind as to the correctness of this conclusion." The Lapstone must be classed as one of the best 'second earlies' of its time.

The SKERRY BLUE made its appearance before 1865, as it was mentioned in the September number of the *Farmer's Magazine* of that year as being very free from blight. The origin of this variety is unknown. It was recommended in 1867 by T.B.W. in a small pamphlet entitled *Cottage Gardening*. It has always been regarded more as an Irish than as an English variety. It was chiefly grown in the northern counties of Ireland, particularly in the neighbourhood of Lough Neagh, in the counties of Tyrone and Derry. Skerry Blues were recommended by Baldwin in his class book *Practical Farming*, 1877.

In the Statistics published by the Department of Agriculture in 1905, the name Skerry Blues occurs, and the acreage recorded in Ireland was 19,570 acres or 3.2 per cent of the total crop. In 1906, the names Black Skerries and Skerry Blues are coupled together, and the acreage given as 25,950 acres or 4.2 per cent of the total crop. In 1907 the name Black Skerries only occurs with a total area of 26,378 acres. How the name came to be changed in the official statistics has never been explained. The name Black Skerry first appeared in the Department's Journal, Volume I, when it was stated to be a new variety. There was nothing new about it, however, except the name. By 1911, Skerry Blues became the third most popular variety in Ireland, being exceeded only by Champion and Up-to-date. The variety was, however, found to be very susceptible to Wart Disease, and as a consequence it has been rapidly displaced by the heavier cropper, Arran Victory, put on the market in 1918.

Skerry Blues were for many years extensively grown in the areas already referred to for the Dublin and Belfast markets, where the variety stood in high repute for its quality, especially during the spring months. Skerry Blue is now a variety of the past, but the name will remain in potato history on account of its high degree of resistance to blight and its exceptionally good cooking quality.

DALMAHOY appeared before 1865. The table already quoted showed that in 1872 it was a fairly popular variety. It never became very prominent in Ireland. A writer in the *Farmer's Magazine*, September,

1865, mentions having over three acres of Dalmahoy, and that they resisted blight tolerably well. Crews* says : "Where a large family is to be supplied all the year round, this variety is to be highly recommended. It is a good cropper, and very white in flesh. We are, I believe, indebted to the late Mr. Joseph Smail, gardener to the Earl of Morton at Dalmahoy Castle, for the introduction of this species. Though not a handsome potato to look at, yet it is an excellent variety when cooked."

It is described by Elliott† as "medium early ; good cropper."

"A Practical Farmer," the author of several useful articles, writing in the *Farmer's Magazine*, April, 1867, says : "this year I have sixty acres to get in. My sorts are Flukes, Regents, Dalmahoy, Rocks and Red Regents—the Birmingham prize Reds."

Paterson's VICTORIA, one of the very greatest varieties in history, was put on the market in 1863. The origin of this variety is related by the raiser himself in an article, "On propagating new varieties of potatoes," for which he was awarded a Gold Medal by the Highland and Agricultural Society of Scotland and published in their *Transactions*, February, 1870. Paterson says, "From 1853 I determined on carrying out my original idea of raising and improving seedling varieties from the plum or apple of vigorous and healthy tubers. The initial difficulty was very great, as potatoes in this country had almost ceased to flower. At considerable expense I imported them from England, the Cape of Good Hope, Australia, America and Calcutta, from which (as well as from our own standard kinds) I selected the healthiest tubers, and planted them in a field of newly taken-in land, with reed manure, by the side of a stream where the atmosphere was damp. All produced flowers, and most of them apples. The experiment was successful, and from the seed or apple were produced these new and improved varieties which I have now given out to the public, and which are acknowledged to be (at home and abroad) of so much benefit to the community. In 1860 I had about 100 tons, from which I selected as many varieties out of the stock as I thought I could undertake to cultivate and give out true to name. From 1860 to 1863 (the stock at this time having increased to about 1000 tons) I planted them on various farms in Forfarshire and Perthshire. In this year we gave out about twenty distinct named varieties, oval and round shaped, also sixteen distinct varieties of kidneys. Rocks and late and early Regents were the common varieties. Still, regardless of cost, the benefit to society has been attained at very considerable pecuniary loss to myself—I might say in fact, almost ruinous."

Paterson described the Victoria as "covered with purple flowers (which kept blooming for three months) and many handsome clusters of plums."

D. Young, writing in the *Transactions of the Highland and Agricultural Society of Scotland*, 1906, says : "The success of the Victoria was immediate and outstanding, and very soon it was largely grown all over the country."

* Crews, A. W. : The Potato and its cultivation, 1880.

† The Woburn Experiments in Potato Disease, Jour. R.A.S.E., 3rd Series, Vol. 3, Part IV.

Crews in 1880 said: "Amidst the many kinds introduced by the raiser of this potato, this variety is universally admitted to be one of the very best late species produced by him or any other cultivator. Very productive, and quality very superior, it possesses also the exceptional qualification of being a first-class keeper. For market it will be found an invaluable kind."

Like some others it was famed in its early days for its comparative immunity to blight, but as usual, as it became older it lost this virtue.

Divers,* writing in 1889, says: "We tried a few rows of Victoria here last season, but they were nearly all diseased when dug up. This shows it is not to be depended on in a bad season, although in dry seasons we have found it very good."

Victoria is one of the very great varieties of history, though not by any means the greatest, nor are there any grounds for crediting it with being the parent of all useful modern varieties as claimed by Findlay† and Salaman‡.

EARLY ROSE was raised by A. Bresee, of Hubbardson, Vermont, U.S.A., in 1867. It has been grown in Great Britain and Ireland under the names Early Rose or American Rose indiscriminately. In 1880 it was grown to the extent of almost two thousand acres in Ireland. This variety remained fairly popular for a great many years.

On the bog soil in the neighbourhood of Athlone, Early Rose has been grown for over fifty years without a change of seed from any outside source. The variety is still grown there on a small commercial scale, and is as vigorous and productive as ever it was. It is grown specially for "seed" purposes, and usually sold in the south of England where it is very popular amongst allotment holders.

BEAUTY OF HEBRON was, according to Salaman, sent out by Peter Henderson, New York, in 1878. Crews in 1880 speaks of it in England as a new variety.

Salaman says, "The pure white flesh distinguishes this variety from Early Rose, the flesh of which is always slightly pigmented." It is doubtful if this difference is sufficient to justify classifying Beauty of Hebron as a distinct variety. In tuber and foliage the two varieties are identical except that there is more colouring in the skin of the tuber, and on the stems and midribs of the leaves in the case of Early Rose.

Both have been useful early varieties, especially for garden cultivation.

PURITAN, which is beyond question a white-tubered sport from Beauty of Hebron, came into commerce in these countries in 1884, according to Sir Matthew Wallace.§

It was the principal early variety grown in Scotland until it was replaced by Epicure about 1900.

* Journal of Horticulture and Cottage Gardener, Jan. 31, 1889, p. 88.

† Findlay, Archibald: The Potato—Its history and Culture, 1905.

‡ Salaman, R. N.: Potato Varieties, 1926.

§ Journal, Dept. of Agr. and Tech. Inst. for Ireland, Vol. 2, p. 205.

The FLOUNDER for many years occupied a very prominent position as an early variety in Ireland. It does not appear to have been grown to anything like the same extent in Great Britain. In 1880, the Flounder occupied by a long way the largest acreage of any early variety in Ireland, viz., 48,500 acres, and this acreage was remarkably equally divided over the four provinces.

The round tuber with deep eyes, such as the Flounder possessed, was never popular in English markets, but was not regarded with any disfavour in Ireland, so long as the tubers boiled dry and floury. The Flounder was outstanding in quality among earlies.

It occupied about 7.5 per cent. of the total acreage under potatoes in Ireland from 1880 to 1904 when a decided decrease set in. It is still grown, but only on a very small scale commercially.

The CHAMPION, the most outstanding variety in the history of potato-growing in Ireland, came on the market in 1876, though it was not grown to any extent in Ireland until 1879, "the wet year," when it established its reputation. The potato crop in 1879 was the worst since records were taken in Great Britain and Ireland; it was probably even worse in many areas than in the disastrous 1846.

The bad crop was due to excessive rainfall during the months June—October. Practically all potatoes rotted either from the excessive wetness of the soil or from the effects of blight. Champion and Magnum Bonum were the only varieties that withstood the disease. Respecting the merits of the former variety, Mr. J. J. Clark* of Goldstone Farm, Hove, thus gives his experience: "The following statement, showing my own experience of the yield per acre of the three leading varieties last season—an experience which is confirmed by every other grower I have spoken to, both in England and Scotland,—may be of some service:—

Yield per acre 1879.				
		<i>Sound</i>	<i>Diseased</i>	<i>Total</i>
Regent	..	$\frac{1}{2}$	4	4 $\frac{1}{2}$ tons
Victoria	..	1	2 $\frac{1}{2}$	3 $\frac{1}{2}$ „
Champion	..	5 $\frac{1}{2}$	—	5 $\frac{1}{2}$ „

It will thus be seen that not only did the Champion produce the largest crop, but the tubers were practically all sound, for out of 230 tons grown on 44 acres I had not more than 7 cwt. of diseased tubers. In 1878, I grew nine tons to the acre all sound. The quality is excellent, being dry and mealy."

Mr. Clark's experience proves that the Champion in its early days possessed remarkable resistance to blight. Like all other varieties it gradually lost this power, and even as early as 1885† complaints were made that it was deteriorating. Although the most useful variety available, it continued to deteriorate, and should have been replaced about 1900,

* Crews, A. W.: The Potato and its cultivation, 1880.

† Davidson, W. D.: The Rejuvenation of the Champion Potato, Economic Proceedings, Royal Dublin Society, Vol. II, No. 21.

if any variety suitable for Irish conditions had been procurable. On account of its continuing popularity, an attempt was made by the writer in 1922 to rejuvenate the variety. From the work that was done then, and since continued in County Donegal, a stock of Champion has been produced that is apparently as vigorous and productive as the variety was at the time of its introduction.

Yet, though no trace of any form of Mosaic disease can be found by Dr. Murphy of University College, Dublin, the new stock does not show the same degree of resistance to blight as was found by Clark in 1879. An explanation of this fact awaits discovery. The rejuvenated stock is, however, decidedly more resistant to blight than ordinary degenerated stocks.

The Champion was raised by John Nichol, Ochterloney. He stated himself, in his evidence before a Select Committee of the House of Commons, 1880, that he saved the seed which gave rise to this variety in 1863, and that he did not remember the names of the potatoes he planted. The variety was got purely by accident. Nichol admired its vigour and quality from the beginning.

As already stated, it made its reputation in Ireland in 1879. As a result, every grower was eager to secure a supply of seed in 1880. The Seed Supply (Ireland) Act, 1880, enabled many of the poorer growers to procure Champions, with the result that in 1880, the first year that statistics of the acreage of the different varieties were secured, Champion occupied 220,984 acres or practically 27 per cent of the total acreage under potatoes. In 1881, the percentage rose to 63, and continued to rise to 79.8 per cent, in 1884. This remarkably high percentage was maintained until 1892, when a slight reduction set in. In 1896, the percentage was 75 and in 1899 it was still as high as 68. Since then, the area has steadily declined, and at the present time Champion is being gradually ousted from its last strongholds by Kerr's Pink and Arran Banner. Champion, however, is likely to hold the record as being the most universally popular variety of potato ever grown in Ireland. This was chiefly due to its superb cooking quality, the Irish ideal of what a potato ought to be.

It is rather remarkable, seeing that really good varieties so rarely turn up, that another very outstanding variety, MAGNUM BONUM, should come on to the market in 1876, the same year as the Champion.

Magnum Bonum was raised by a well-known raiser, James Clarke, Christchurch, Hampshire, and put on the market by Sutton & Sons, Reading. This variety was never grown very extensively in Ireland except in some of the Northern counties, where it was grown for export. In other parts of the country the Champion was preferred.

In England, however, the Magnums made a fairly clean sweep of all that went before. A writer in the *Journal of Horticulture*, December 15th, 1887 says: "A few years ago Regents, Victorias and White Rocks were chiefly employed in field culture in the large potato-growing districts for winter and spring use, but these have been practically superseded, and mainly by the Magnum Bonum. There is probably more of this variety

grown than all others put together for market purposes during the period named, and its introduction and increase have been of unspeakable advantage to both cultivators and consumers."

It is generally known that any samples of the BRUCE potato tested within recent years have been synonymous with Magnum Bonum. It is open to question whether these samples were the true Bruce, or strains of Magnum Bonum. In other words, was the Bruce, as originally put on the market, fairly successfully by Findlay, a genuine new production, or merely a re-named Magnum Bonum? The latter idea is widely prevalent, and is supported, peculiar to say, by the first circular issued by Findlay himself. The circular is headed:—

"The Bruce" potato, raised and offered for Seed by Archibald Findlay, merchant, Markinch.

Markinch, 12th Jan., 1888.

In a testimonial published in this circular from George Kyd, Esq. (of Hay & Kyd), Victoria Auction Mart, Perth, the writer states: "In general appearance it turned out with me not unlike the Magnum Bonum, but the yield was quite a third more, and as a table potato it is decidedly superior," (8th January, 1888).

Magnum Bonum held the field until it was replaced by a production of Mr. Findlay's, probably the best all-round variety the world has ever seen—the Up-to-Date.

Magnum Bonum is worthy of a high place amongst the great varieties of the past.

A third variety known as MAINCROP that came on the market in 1876 was also raised by James Clarke, Christchurch. Maincrop is supposed to have come from the same seed apple of Early Rose as Magnum Bonum.

Maincrop made slow progress, though its quality was always an outstanding feature. The variety was renamed LANGWORTHY by the late J. Niven, Perth, about 1900, and under this name it was grown extensively in Scotland and in parts of Ireland. In 1905 a russet-skinned sport from Maincrop was discovered and named GOLDEN WONDER. On account of the distinctive features of the Golden Wonder tuber, and its extraordinary good quality, this variety has been widely, though not particularly extensively, planted, due to its rather poor yielding capacity. This is the only variety known to the writer acclaimed by all users whether in England, Ireland or Scotland, as being of outstanding quality. This is a wonderful tribute and well deserved by this variety. Mr. John Chisholm, Gibston, Huntly, then of Ladysbridge, Banff, began a selection of vigorous and apparently healthy plants of this variety in 1922, and as a result a marvellous improvement in the vigour was brought about. Since then, a stock has been raised in Ireland from single tested plants, and although the stock cannot be described as perfect, it is capable of producing a very satisfactory yield, if properly treated. Golden Wonder is a very slow tuberizing variety. It requires to be sprouted, planted early and well sprayed. The tubers are remarkably resistant to blight, but the foliage has no marked resistance.

Maincrop and its near relation Golden Wonder stand out as the acme of perfection for quality.

INTERNATIONAL KIDNEY was raised by Robert Fenn, Sulhampstead, and put on the market by A. Dean in 1879. It is included in this list on account of the important position it has occupied in the early potato trade of Jersey for a period of about 40 years and is still the principal variety grown there. How it has retained its vigour is a mystery. A certificate was awarded to Fenn for International, "a white kidney, seemingly of good quality," at the Potato Exhibition at Alexandra Park, September 27th and 28th, 1876. The variety was notorious for bad quality. Sir M. Hicks Beach, Bart., at a luncheon (at which the raiser happened to be present though unknown to the speaker) said that he had forbidden his gardener sending International again to his table.*

ABUNDANCE was raised by James Clarke, Christchurch, and introduced by Sutton & Sons in 1886. It can best be classed as an early Maincrop. The outstanding qualities of Abundance are its particularly good cooking quality, its suitability for comparatively early digging and its very vigorous foliage. It is still fairly extensively grown, especially in the northern counties of Ireland, usually under the name of SUTTONS.

BEAUTY OF BUTE was put on the market about 1890 by James Heron, Rothsea, Bute. Though it cannot be classed amongst the great varieties, it deserves mention as it still holds a place in some parts of Ireland. In 1896 there were 1803 acres in Ireland. A re-named Beauty of Bute, ARDCAIRN BEAUTY, came into prominence for a few years. In 1904, there were 43,567 acres of Beauty of Bute as well as 1422 acres of Ardcairn Beauty : equal to 7 per cent. of the total acreage under potatoes in Ireland. In 1910, the percentage had fallen to 4.8 per cent., and by 1916 to 3.2 per cent. Since then the area has become negligible, though there are still some small patches planted

UP-TO-DATE was raised and introduced by Archibald Findlay in 1894. Some doubt has been expressed on the origin of this famous variety and as to whether Findlay was really the raiser. Salaman† says : "The Up-to-date potato was introduced by the late Mr. A. Findlay in the year 1894. He stated that its parentage was Victoria (Paterson's)* Blue Don‡. (This question has been already discussed, see page 59). It is, however, a fact that a variety called *Scottish Triumph*, from which Up-to-date has been said to be quite indistinguishable, was in existence before this date. The late Mr. Gemmel of Flakefield, Chapelton, near Strathaven, was the raiser of this latter variety, which he showed at the Kilmarnock Root Show in 1892."

* Journal of Horticulture and Cottage Gardener, March 21st, 1889.

† Salaman, R. N. : Potato Varieties, 1926.

‡ Findlay said, "a seedling of the old Blue Don." See Mark Lane Express and Agricultural Journal, 25th Sept., 1893.

On Findlay's behalf it must be admitted that he was a genuine raiser, even if there is a certain amount of doubt about the origin of the "Bruce." His seedlings were exhibited to the public each season. It is reported in the *North British Agriculturist* of 7th October, 1891, that at a public demonstration of Mr. Findlay's seedlings on the farm of Treaton: "Amongst the newer varieties here, 'Lady Frances' and 'Her Majesty' were both maintaining their reputation as exceptionally heavy croppers, but curiously enough, neither could equal, in yield at least, a two-year-old variety named 'Up-to-date' which quite surprised the visitors alike at its superiority of quality and prolific tendencies. It was estimated that quite twelve tons per acre would be gathered from the part of the field devoted to this particular variety."

In the *Farming World*, 21st October, 1892, at another public demonstration of Mr. Findlay's seedlings, it is reported that: "Leaving the unchristened seedlings at present, we came to a new variety about ready to fight its way in the market. This sort bears the fashionable title of Up-to-date, and gives promise of justifying its suggestive name. It is of nice colour, shape and size, and dug up in large numbers. The company were unanimous in predicting a great future for Up-to-date."

In 1893, at Findlay's annual public demonstration, a reporter in the *Mark Lane Express and Agricultural Journal*, 25th September, 1893, said: "Proceeding to the portion of the field (at Markinch) where the new variety of Up-to-date, which is a four-year-old, and of which excellent results were last year anticipated, the expectations of the visitors were raised to a high pitch. Three shaws were laid bare, which showed the largest yield which had yet been seen. Mr. Findlay was highly complimented for these extra results, and in answer to a question as to its propagation, he said it was a cross between the old Victoria and a seedling of the old Blue Don."

"In other parts of the field various shaws of the same variety were also dug with like gratifying results."

"The journey was then resumed, the farm of Mr. James Fyshe, Treaton, about two miles distant, being the next halt, and where a good quantity of Up-to-date have this year been grown." In 1894, Mr. Findlay had about 17 acres of Up-to-date growing on the farm of Treaton.* It was put on the market this year.

The Up-to-date was not long in making its virtues apparent. It proved itself a wonderful cropper, and extraordinarily true to type. No matter how large the tubers become they always retain their perfect shape. The variety is wonderfully tolerant of most forms of Mosaic disease, and still retains its extraordinary vigour. In Co. Donegal many excellent crops can be seen.

This variety is in demand for seed purposes in many parts of the world. Like all the great varieties that preceded it since blight made its appearance, it gradually became more liable to this disease, though in Ireland where crops are well sprayed the disease causes little loss.

* *North British Agriculturist*, 3rd October, 1894.

The Up-to-date always excels in a dry season, as apparently it can withstand very dry conditions better than any other variety.

Taking everything into consideration the writer's view is that the Up-to-date was the best variety that has ever been produced.

BRITISH QUEEN, the most popular second early variety ever grown in Ireland, was raised and introduced by A. Findlay in 1894 the same year as the Up-to-date. This variety was also commented on at some of the public demonstrations, but it did not receive the same amount of notice as the Up-to-date. It took a few years to make headway, but in 1901 the acreage in Ireland was 604 acres, in 1902, 1,226 acres, and in 1903, 2,134 acres. The area rose rapidly, and in 1916 it reached 48,781 acres, equal to 8.3 per cent. of the total area under potatoes. It was almost equally popular in Great Britain, but while in Ireland it still retains its popularity, in Great Britain it has given way to other varieties less susceptible to "blight."

Of the more modern varieties, those most likely to make a place in history are, in chronological order, DUKE OF YORK, EPICURE, NINETYFOLD, SIR JOHN LLEWELYN better known as ECLIPSE, SHARPE'S EXPRESS, KING EDWARD, KERR'S PINK, GREAT SCOT, ARRAN CHIEF, MAJESTIC, ARRAN VICTORY and ARRAN BANNER. These varieties have already been very fully described in one or more of the following publications:—Salaman, *Potato Varieties*, 1926; *The Maintenance of Pure and Vigorous Stocks of Varieties of the Potato*, Miscellaneous Publications No. 3, Revised Edition, 1927, of the Board of Agriculture for Scotland; Journal Department of Agriculture, Dublin, Vol. XXX, No. 2 and XXXI, No. 1 by the writer of this article.

It is not necessary to go into details regarding these varieties, but it may be remarked that Kerr's Pink has definitely established its place amongst the most outstanding varieties in history. It is probably the most popular variety ever grown in Scotland, and is at present the most popular variety in Ireland, though it is safe to say it will never reach the predominating position once occupied by the Champion.

Attention may be drawn to the significant phrase "they never curl" given of certain varieties towards the end of the eighteenth and beginning of the nineteenth century, a time when the Curl was a very formidable disease. Such varieties were always outstanding.

In the light of present-day experience, this description cannot be regarded as exaggerated, though, if a sufficiently careful examination had been made, these varieties would probably have been found gradually showing certain symptoms of degeneration, such as a reduction in the size of leaflets, a reduction in the size of the whole plant, less bloom, etc. That such varieties did eventually degenerate and become unprofitable, experience has only too clearly proved. They must, however, have possessed a higher degree of resistance to the Curl and associated diseases than the majority of varieties.

CURL is, of course, now known to be due to LEAF ROLL and various forms

of Mosaic. So far as is known, all varieties are susceptible to Leaf Roll under suitable artificial conditions, but it is found in the field that Leaf Roll occurs much more frequently on certain varieties than on others. The writer has had a fairly extensive experience of the inspection of growing crops, and has not yet seen Leaf Roll on Champion, Buchan Beauty (an old variety), Great Scot or King Edward under ordinary field conditions. This is also true of several other less important varieties.

In dealing with the various forms of MOSAIC, no present-day variety has been found to be resistant under artificial conditions, but several varieties are what is termed tolerant of the disease, viz., although plants may be infected, the effect of the disease is not so severe. The most tolerant varieties grown on a large scale are Up-to-date, Great Scot and King Edward.

Several of the old varieties such as Ox Noble, Early Champion, etc., must have been somewhat similar to Great Scot in respect of the virus diseases. Apparently it is only varieties resistant to or tolerant of these various diseases that can survive for any considerable period.

LIST OF THE MOST OUTSTANDING POTATO VARIETIES, 1730-1930.

Placed in chronological order.

	Date of Introduction.
The Black Potato	.. (before 1730)
Cluster or Howard	.. (1765)
Apple	.. (about 1768)
Red-Nosed Kidney	.. (about 1775)
Manly	.. (before 1776)
Ox Noble	.. (before 1787)
Early Champion	.. (before 1787)
Lumper	.. (before 1808)
Cups	.. (before 1808)
Ashleaf	.. (about 1813)
Regent	.. (before 1841)
Fluke	.. (1841)
Rocks	.. (before 1856)
Myatt's Ashleaf	.. (about 1853)
Victoria (Paterson's)	.. (1863)
Champion (Nichol's)	.. (1876)
Magnum Bonum	.. (1876)
Up-to-date	.. (1894)
Kerr's Pink	.. (1917)

REPORT OF THE SEED PROPAGATION DIVISION, 1933.

The year 1932 was generally regarded as one of the best ever recorded for the production of all cereal crops, but as regards weather conditions, the present season surpassed it. The long spells of dry weather, however, caused a serious shortage of water in many parts. The continued drought undoubtedly caused a reduction in the yields of grain and straw, but the loss thus incurred was recompensed by the ease and economy with which the crops were saved.

In the month of December, 1932, the rainfall was excessive, while the conditions in the January and February following were dry, with considerable sunshine and less rainfall than usual. Towards the end of the latter month there was a remarkably heavy snowstorm, and owing to the dry conditions prevailing previously, the snow remained a comparatively long time on the ground. Dry weather with sunshine continued during March, and the sowing of seed became general towards the end of the month. In April, while sunshine was again below the average, the conditions for sowing and tillage generally continued favourable; frost in the third week, however, did a certain amount of damage to young brairds.

May brought ample and persistent rain and with a temperature above the average, so that crops made excellent progress.

In June the average temperature was remarkably high, although there was little sunshine. Similar conditions prevailed during July, with both sunshine and rainfall still below the average; towards the end of this month a north-westerly gale swept over the whole country, which had the effect of ripening all cereal crops prematurely.

August was a month of sunshine and warmth, making it possible for the harvest to be saved with the minimum of labour and expense.

The weather conditions in September eclipsed all previous records for both sunshine and temperature since the Meteorological Station was set up at Ballinacurra in 1904. The sunshine amounted to 206 hours, as compared with the previous maximum record of 188 hours in 1906, and the rainfall was almost negligible. The conditions were somewhat similar during October.

This season on the whole was remarkable for the long spells of fine weather. The dryness of the ground and the high temperature combined to produce conditions such as have only been approached twice in this century, viz.: in 1911 and in 1921. Yet, curiously, the total sunshine recorded for the months of May, June and July of 1933 amounted to 74 hours less than the average total for the same period in any year since observations were first recorded at Ballinacurra.

It was particularly noticed that this was the first year since this cereal work was commenced in 1901 that ripening at all centres was almost simultaneous. There was practically no difference in the time of ripening between crops grown in the extreme south and those grown in the midlands and further north.

In consequence of the favourable conditions threshing was also commenced much earlier than usual. The moisture in the grain ranged around 16 per cent., or about 5 per cent. less than average.

The yield of corn was generally good, although the premature ripening already referred to undoubtedly caused a reduction in the yield from what promised early in the season to be a record; the colour of the grain was invariably good, but the grain itself was often light and steely.

As in previous years, the bulk of the barley propagation work was carried on at the Cereal Station, Ballinacurra, County Cork, under the direct supervision of Mr. J. H. Bennett and in close collaboration with Messrs. A. Guinness, Son & Co., Ltd., at whose Experimental Maltings the malting tests were conducted. The work consisted of the usual pure line propagations, chess-board and half-drill-strip experiments, as well as experiments with the use of different dry seed dressings as a preventive against disease, and an experiment to test the efficiency of the new Hornsby-Leake Precision Corn Drill.

The Large-scale Variety Experiments were conducted at ten centres in seven different counties.

Field and extension plots of Victory II., Black Tartary, Failte, Sandy and New Black Oats were grown on the farm of Messrs. J. H. Bennett, Ltd. Large extension plots of Victory II. and Failte were grown by six farmers in the neighbourhood of Ballinacurra. The produce of these latter plots will be available for distribution to seed merchants and selected growers in 1934.

BARLEY.

For several years past, treatment of the seed barley with one or other of the well-known fungicide powders has been found most effective against the disease known as Smut (*Ustilago H.*) The same dressings have also been found to act against the disease known as Net Blotch (*Helminthosporium*), but, owing to the rapidity with which secondary and other infections of this disease spread, these dressings have not given as good results in this connection as were anticipated. It is hoped, however, that by repeatedly using such dressings healthier parent stocks may be produced.

With the object of reducing the effect of these diseases to a minimum, the seed for all the propagations and experiments at the Cereal Station at Ballinacurra, Co. Cork, as well as all the seed despatched from that Station for experiments and further propagations, was dressed with Abavit Powder.

The results, as far as the prevention of Smut was concerned, were satisfactory as in past years, for no smutted plant was seen in any of the crops grown from the treated seed, and all these crops were healthy and vigorous.

PROPAGATIONS.

Continuing the new method adopted in 1929 for the selection of a pure line of Spratt-Archer 37, No. 3, the single line of this variety was sown with twenty-five lots of five grains in each. At harvest time ten grains were

taken from one plant in each of these five grain-groups for sowing next year. There were also twenty-five lines of this variety, each sown with the produce of a single ear taken from the same plant as the ten grains. The produce of these lines will be propagated for bag malting trials in due course. The object of the bag malting trial is to ascertain if the malting quality of the variety is being maintained and not declining in any one of the twenty-five groups.

A trial has been in progress for some years with the produce of the individual grains from a single ear of Spratt-Archer 37, No. 3. For the past two years it was noted that there was a slight difference in the foliage and habit of growth of the plants on one of these plots compared with the plants on the remainder of the plots, and so the whole series was sown again this year when the same differences were evident. It was also noticed that on the plants in another plot (No. 15) similar differences occurred in the early stages, but that as the plants matured these differences disappeared. The produce of the plots was in due course analysed and subjected to bag-malting tests, when it was found that the produce of both these plots differed materially from that of the others.

The results of these experiments go to show that, in a variety which is itself a hybrid, the produce of the individual grains of even a single ear may differ, and that it is not desirable to raise stocks of seed from a single plant.

In addition to the propagations of Spratt-Archer 37, No. 3, above mentioned, there were sixty-five other single lines in the New Cage and twenty-nine in the Old Cage. These comprised most of the well-established varieties which are, or have been, grown in this and other countries; and a number of hybrids made by crossing such varieties as Spratt-Archer 37, No. 3, and Spratt-Archer 37, No. 4, with July six-rowed and Victory as well as a number of selections from a natural cross of D.S.K. Binder and July six-rowed, amongst which there is great variation.

Any of these new hybrids which showed a trace of inferior characters, such as weak straw or infertility, were discarded, in order to reduce the number to be carried through for further experiments.

Thirty-two of these varieties were grown in garden plots in the Roschill Cage Field, and as they were all sown in line they offered a good opportunity for observation.

Sixteen of these varieties were grown a stage further in field plots in order to provide sufficient seed for preliminary trials and further propagations.

Eight varieties were included in the First Pedigree plots, five of which were grown on the farm of Mrs. O'Brien and three on the farm of Cornelius Deasy, both in the neighbourhood of Ballinacurra. The produce of these plots will be used for the Large Scale Variety Experiments, for further propagation and for distribution for seed purposes. The second pedigree plots of Spratt-Archer 37, No. 3, were grown on the following farms:—

			Brls.	Sts.
Thomas Cronin, Castleredmond, Ballinacurra	..	..	5	0
James Leahy, Innegrega, Ballinacurra	..	..	5	6
D. J. Leahy, Jamesbrook, Ballinacurra	..	..	3	12
Cornelius Deasy, Loughatalia, Ballinacurra	..	..	2	8
Total	..	..	16	10

The produce of these plots will be distributed under the Department's scheme for the distribution of pedigree seed to members of the Irish Maltsters' Association and others interested in the propagation of seed barley in the spring of 1934.

Distribution of Pedigree Seed.

Under the scheme mentioned in the last paragraph, 257 barrels of pure line Spratt-Archer 37, No. 3, were distributed as follows :—

			Brls.	Sts.
P. J. Roche & Sons, New Ross, Wexford	..	..	10	0
P. J. Roche & Sons, Enniscorthy, Wexford	..	..	10	0
P. Breen & Co., Castlebridge, Wexford	..	..	10	0
F. Codd & Co., Mountmellick, Laoighis	..	..	10	0
Beamish & Crawford & Co., Cork	..	..	6	0
R. Perry & Sons, Rathdowney, Laoighis	..	..	3	0
Castlebellingham & Drogheda Brewery Co., Ltd., Drogheda, Co. Louth	..	..	15	0
Birr Maltings, Birr, Offaly	..	..	12	0
F. A. Waller & Co., Ltd., Banagher, Offaly	..	..	12	0
Robert Gibney & Co., Ltd., Portlaoighise, Laoighis	..	..	8	0
A. J. M. Reeves, Athgarvan, Newbridge, Co. Kildare	..	..	4	8
Minch, Norton & Co., Ltd., Athy, Co. Kildare	..	..	40	0
Minch, Norton & Co., Ltd., Nenagh, Co. Tipperary	..	..	15	0
Minch, Norton & Co., Ltd., Bagenalstown, Co. Carlow	..	..	10	0
Minch, Norton & Co., Ltd., Goresbridge, Co. Kilkenny	..	..	10	0
J. & A. Tarleton, Ltd., Tullamore, Offaly	..	..	10	0
McArdle, Moore & Co., Ltd., Dundalk, Co. Louth	..	..	4	0
J. H. Bennett, Ltd., Ballinacurra, Co. Cork	..	..	9	0
George Read & Co., Roscrea, Co. Tipperary	..	..	10	0
Joshua Watson & Sons, Ltd., Carlow	..	..	20	0
W. J. O'Keeffe & Sons, Wexford	..	..	5	0
P. & H. Egan, Ltd., Tullamore, Offaly	..	..	10	0
D. E. Williams, Ltd., Tullamore, Offaly	..	..	10	0
D. Smithwick & Co., New St., Kilkenny	..	..	3	0

As well as Spratt-Archer 37, No. 3, the following quantities of other varieties were also distributed from Ballinacurra as nuclear seed stocks :—

	Brls.	Sts.
July Six-Rowed, The Agricultural School, Athenry ..	5	0
D.S.K. Binder, The Agricultural School, Athenry ..	1	4
Old Irish, J. L. Nunn, Castlebridge, Wexford ..	1	14

Inspection of Growing Crops.

In order to provide maltsters and others interested in seed barley production with information about the crops of Spratt-Archer barley grown in their respective areas which, if properly saved, would be suitable for seed purposes, the Department arranged to have certain growing crops inspected. The inspections were under three headings, namely :—(1) Crops grown from seed obtained direct from Ballinacurra ; (2) crops grown from seed which was the produce of seed obtained from Ballinacurra in 1932 ; and (3) certain crops produced from Commercial Spratt-Archer.

A total of 5,923 acres was inspected, and of this 5,349 acres were passed as likely to produce grain suitable for seed purposes. Of the 379½ acres inspected under (1) 1.4 per cent. were rejected ; of the 3,244 acres inspected under (2) 8.3 per cent. were rejected, and of the 2,299½ acres under (3) 12.9 per cent. were rejected.

Under heading (1) the crops were rejected in these cases because they had been sown in close proximity to another crop from which they could not be guaranteed to be kept separate ; of the 270 acres rejected under (2) smut was present in 39 acres, 106½ acres had too many impurities, 107½ acres were grown in the fields with other varieties of barley without sufficient division to ensure their not being mixed. Noxious weeds were present to a large extent in 17 acres, and in the remaining 17 acres the quality of the barley was likely to be inferior. Of the 298 acres rejected under heading (3) 94½ acres had smut present, 194 acres had impurities, 88 acres were sown adjacent to other barley, 51½ acres had an undue amount of weeds, and 8 acres were likely to produce poor samples.

Large Scale Variety Experiments.

The object of these experiments is to ascertain what is the value of new varieties of barley which have been produced by hybridization or are obtained from other countries, when grown under ordinary farming conditions encountered in the barley-growing counties of the Saorstat. All new varieties are, in the first instance, tried on a small scale, and it is only the most promising ones that are included in the large scale experiments. In these experiments their value for malting and brewing is determined as well as their yield, and for this purpose a sufficient bulk of corn must be produced so that the results may be a fair indication of what would happen with larger bulks. Another important quality of these barleys which these

experiments help to reveal is the ability of the straw to stand under varying conditions of soil and climate, and for this reason most of the plots are grown on manured land, *i.e.*, land which was under a root crop in the previous season, or on land which has been given a dressing of artificial manures. The experiments this year were conducted at ten centres, one each in Counties Cork, Kilkenny, Louth, Tipperary and Kildare, two in Offaly, and three in County Wexford.

The following varieties were grown at all centres :—Spratt-Archer 37, No. 3 ; Spratt-Archer 37, No. 4 ; D.S.K. Binder, Hybrid No. 4A.

The area under the two first-named varieties at all centres was one statute acre each, while that for the two latter varieties was one-half statute acre each in all cases.

TABLE I.
LARGE SCALE BARLEY VARIETY EXPERIMENTS, 1933.

Centre	Name and Address of Grower	Description of Soil	Previous Crops	Date of Sowing	Date of Harvesting
1	Mrs. Tait, Hermitage, Rostellan, Co. Cork ..	Loam .. Sub-Soil Shale ..	Oats, 1931 Roots, 1932	March, 23 ..	August 4 " 7
2	William Watkins, Coolnagrower, Portal, Birr, Offaly	Light Loam .. Sub-Soil Limestone	Oats, 1931 Roots, 1932	April 11 ..	" 7 " 12
3	John Bryan, Dunbell, Kilkenny ..	Medium Loam .. Sub-Soil Gravel and Limestone.	Wheat, 1931 Turnips, 1932	" 10 ..	" 8 " 11
4	Ed. Slattery, Ballycommon, Nenagh, Co. Tipperary	Strong Loam .. Sub-Soil Gravel and Limestone.	Barley, 1931 Roots, 1932	" 5 ..	" 7 " 8
5	Mrs. Segrave, Dunany, Dunleer, Co. Louth ..	Light Loam .. Sub-Soil Gravel and Clay.	Barley, 1931 Roots, 1932	" 8 ..	" 9 " 16
6	N. Howlett, Ramsgrange, Co. Wexford ..	Stiff Loam .. Sub-Soil Shale ..	Oats, 1931 Roots, 1932	March 30 ..	" 7 " 10
7	M. P. Minch, Rochfield House, Athy, Co. Kildare	Deep Loam .. Sub-Soil Gravel ..	Grass, 1931 Barley, 1932	" 14 ..	July 26 August 5
8	P. Byrne, Ballygrangans, Kilmore, Co. Wexford	Sandy Loam .. Sub-Soil Gravel ..	Barley, 1931 Beet, 1932	April 7 ..	" 7 " 11
9	D. Morris, Tomahurra, Enniscorthy, Co. Wexford	Shaly Loam .. Sub-Soil Shale ..	Wheat, 1931 Roots, 1932	March 27 ..	July 29 August 7
10	D. O'Brien, Ballinamere, Tullamore, Offaly ..	Medium Loam .. Sub-Soil Limestone	Oats, 1931 Potatoes, 1932	" 24 ..	July 31 August 8

The seed for all plots was obtained from the produce of the first pedigree plots grown at Ballinacurra in 1932 : it was treated before despatch from Ballinacurra with Abavit powder, at the rate of 10ozs. per barrel of seed, as a prevention against smut disease. The names and addresses of the growers are shown in Table I., together with the crops grown on the land during the two previous years, the nature of the soil and sub-soil, as well as the dates of sowing and harvesting. Under the column headed " Date of Harvesting," the first or upper date given in each case is the date on which the D.S.K. Binder plot was harvested, and the lower date or dates that on which the other varieties were harvested.

The next table (Table II.) gives the yields of grain (per statute acre) as dressed at the time of threshing and delivered to the experimental maltings, the average value of the grain per barrel as valued by several independent buyers, and the total value of the crop per acre, which includes the screenings valued at sixpence per stone throughout.

Table III. gives the analysis of the grain, as determined for its malting and brewing value.

TABLE II.
LARGE SCALE BARLEY VARIETY EXPERIMENTS, 1933.—YIELD AND VALUE OF GRAIN.

Centre	SPRATT-ARCHER 37, No. 3				SPRATT-ARCHER 37, No. 4				D. S. K. BINDER				HYBRID No. 4A																
	Yield of Dressed Grain		Value per Barrel		Total* value of Grain, including Screenings		Yield of Dressed Grain		Value per Barrel		Total* value of Grain, including Screenings		Yield of Dressed Grain		Value per Barrel		Total* value of Grain, including Screenings												
	Brls. Sts.	s.	d.	£ s. d.	Brls. Sts.	s.	d.	£ s. d.	Brls. Sts.	s.	d.	£ s. d.	Brls. Sts.	s.	d.	£ s. d.													
<i>Cork:</i>																													
Mrs. Tait ..	10	11	12	7	7	3	0	10	9	12	8	7	3	4	14	5	12	10	9	13	2	11	2	13	2	7	19	6	
<i>Tipperary:</i>																													
Ed. Slattery ..	9	1	13	6	6	5	4	12	4	13	7	8	11	5	11	0	13	3	7	9	9	10	8	13	8	7	10	6	
<i>Kilkenny:</i>																													
J. Bryan ..	11	1	13	11	7	18	5	12	9	13	10	8	19	0	10	10	13	8	7	9	9	9	8	13	11	6	18	3	
<i>Offaly:</i>																													
Wm. Watkins ..	11	11	13	3	7	19	4	12	3	13	5	8	7	6	13	2	13	3	8	17	5	10	9	13	6	7	5	7	
D. O'Brien ..	10	4	13	4	6	18	11	10	3	13	5	6	19	5	9	6	13	4	6	7	0	9	7	13	8	6	11	0	
<i>Kildare:</i>																													
M. Minch ..	6	14	13	4	4	19	8	7	5	13	5	5	6	1	4	9	13	6	3	5	7	3	11	13	10	2	18	0	
<i>Louth:</i>																													
Mrs. Segrave ..	15	1	13	8	10	9	7	16	2	13	8	11	8	5	16	8	13	6	11	3	9	14	1	13	9	9	18	4	
<i>Wexford:</i>																													
N. Howlett ..	12	3	13	5	8	8	6	13	0	13	3	8	18	3	14	10	13	5	10	0	3	11	14	13	7	8	5	4	
P. Byrne ..	11	4	13	7	7	14	4	11	9	13	5	7	17	2	10	1	13	4	6	14	8	10	8	13	9	7	5	5	
D. Morris ..	12	7	13	10	8	14	1	14	9	13	10	10	2	8	16	5	13	6	11	3	9	13	15	13	11	9	18	0	
Total ..	110	9	—	—	76	11	2	120	5	—	—	83	13	3	120	8	—	—	82	5	1	105	3	—	—	—	74	9	11
Average ..	11	1	—	—	7	13	1	12	1	—	—	8	7	4	12	1	—	—	8	4	6	10	8	—	—	—	7	9	0

* Screenings valued at 6d. per stone.

TABLE III.
LARGE SCALE BARLEY VARIETY EXPERIMENTS, 1933.
ANALYSIS OF PRODUCE.

GROWER	SPRATT-ARCHER 37, No. 3				SPRATT-ARCHER 37, No. 4				D. S. K. BINDER				HYBRID No. 4A			
	Bushel Weight	Mois- ture %	On Dry Matter		Bushel Weight	Mois- ture %	On Dry Matter		Bushel Weight	Mois- ture %	On Dry Matter		Bushel Weight	Mois- ture %	On Dry Matter	
			Wt. of 1,000 Corns	Nitro- gen %			Wt. of 1,000 Corns	Nitro- gen %			Wt. of 1,000 Corns	Nitro- gen %			Wt. of 1,000 Corns	Nitro- gen %
Mrs. Tait	51.9	18.2	32.3	1.82	52.4	18.0	33.4	2.02	54.4	16.9	35.6	1.95	53.9	16.5	35.2	1.94
Wm. Watkins	50.8	18.5	31.7	1.48	50.4	20.0	33.1	1.53	55.3	16.5	39.3	1.55	52.8	17.2	35.1	1.51
J. Bryan	54.8	16.7	35.2	1.44	54.0	17.2	35.0	1.55	55.8	16.2	38.8	1.51	56.5	16.2	38.1	1.45
E. Slattery	53.8	14.7	32.5	1.58	54.3	15.5	32.8	1.48	55.8	14.9	38.0	1.65	55.7	14.5	35.4	1.61
Mrs. Segrave	54.7	17.5	36.1	1.45	54.1	17.8	36.6	1.59	56.4	17.2	41.2	1.51	56.6	17.3	38.6	1.46
N. Howlett	53.5	16.5	32.5	1.46	53.3	16.3	31.6	1.61	54.9	17.2	38.0	1.52	53.4	17.9	33.9	1.49
M. P. Minch	53.1	14.6	32.2	1.25	53.2	14.7	32.5	1.31	55.0	14.8	37.2	1.37	55.9	14.7	35.2	1.31
P. Byrne	53.3	18.2	32.6	1.32	53.4	18.2	32.3	1.32	53.4	19.3	37.0	1.30	54.3	18.5	35.3	1.31
D. Morris	57.0	14.8	35.2	1.35	56.6	15.0	35.2	1.40	57.2	14.5	39.1	1.49	57.5	14.3	37.2	1.47
D. O'Brien	52.8	16.3	33.3	1.42	54.4	16.0	34.3	1.47	54.8	16.4	37.3	1.41	55.5	16.1	36.1	1.49
Average	53.6	16.6	33.4	1.46	53.6	16.9	33.7	1.53	55.3	16.4	38.2	1.53	55.2	16.3	36.0	1.50

It will be seen in Table I. that D.S.K. Binder was again harvested before any of the other varieties though, in some cases, the difference was not as much as in past years. This was probably owing to the premature ripening of the barley in all the plots. It was also noticed that Hybrid No. 4A was inclined to ripen slightly earlier than the Spratt-Archers, and possibly in a more normal season this difference would be greater.

On account of its early ripening, D.S.K. Binder suffered severely at several centres from the depredations of both rooks and small birds. The fact of this variety being sown in long, narrow half-acre plots allowed the birds greater opportunity to cause depredations. In spite of these depredations the average yield of the D.S.K. Binder was almost equal to that of Spratt-Archer 37, No. 4 (see Table II.), and its value only about 3/- per acre less. Hybrid No. 4A, which was being tried in these experiments for the first time, was also sown in half-acre plots next to the D.S.K. Binder plots, and consequently suffered from depredations by the birds to a certain extent. This was especially the case at the Kildare centre, where the rooks caused serious damage to this variety as well as to the D.S.K. Binder, and left both these plots practically useless. The average yield of this variety is, in consequence, below that of the others. It should be noticed, however, that at all the ten centres its produce was valued the highest, and its average monetary value per statute acre was only 4/- less than Spratt-Archer 37, No. 3.

In Table II. it will also be seen that at eight centres out of the ten Spratt-Archer 37, No. 4, yielded heavier than Spratt-Archer 37, No. 3, with a final average superiority of fifteen stones weight and a monetary difference of 14/3 per statute acre.

An Experiment to compare the Hornsby-Leake Precision Corn Drill with the Force Feed Drill.

This Hornsby-Leake machine was recently designed as the result of investigations made at Cambridge. It is claimed for it that by its greater regularity in spacing and distribution of the seed a *higher* yield is obtainable and a lesser seeding required. The principle by which this regularity in spacing is obtained is by the passing of the seed through a vertical rotating cone. As the cone revolves there are two ratchets which impart to it a constant vibration; this vibration gives to the seeds what is called a shuddering motion, and expels them in a regular even manner.

The experiment was carried out in a field of Spratt-Archer 37, No. 3, barley, and the rate of sowing was regulated beforehand, so that each machine was sowing, approximately, 12 stones per statute acre.

The Force-Feed drill has thirteen coulters spaced at seven inches apart, of which the outside one on each side was stopped up. The Hornsby-Leake drill has twelve coulters, also spaced at seven inches apart, of which the outside one on the right-hand side only was stopped up. Thus, each machine sowed the seed from eleven coulters.

There were twenty-two strips sown with each machine. The machines when sowing followed each other, wheel on wheel, but at each turn they

changed position, so that the machine which went up the field first came back last. In this way two strips sown by one machine were alternated with two strips sown by the other machine.

The seed was sown on March 24th, and observations were made at frequent intervals until it was cut on August 3rd.

On April 25th, when the plants were well up in a single shoot about three inches long, a count was made of the number of plants present in six lengths of six feet each, and the six lengths were taken at intervals along a row sown by one coulter of each machine. The number of plants counted were as follows :—

Hornsby-Leake Drill—92, 109, 91, 101, 96, 95.—Total, 584.

Force-Feed Drill—86, 64, 68, 89, 90, 74.—Total, 471.

At the same time a further number of counts were made in a zig-zag manner right across all the strips. In each case a count was made in each sowing. They were as follows :—

Hornsby-Leake Drill—84, 79, 103, 98, 93, 89, 97, 100, 93, 108, 99, 108, 94, 97, 101, 99, 75, 88, 100, 101, 78, 91, 98, 86, 77.—Total, 2,336.

Force-Feed Drill—80, 71, 47, 86, 75, 78, 67, 81, 84, 87, 65, 70, 73, 78, 68, 48, 65, 81, 78, 66, 66, 55, 62, 67, 73.—Total, 1,771.

It will be seen that in every case the number of plants per six foot length was greater in the case of the Hornsby-Leake drill. So far no satisfactory explanation has been found to account for what can have become of the remainder of the grains sown by the Force-Feed drill.

As the season advanced, the plants tillered out and the lines filled up until there was no noticeable difference between the strips. A difference, however, began to appear about June 13th, when the corn in the strips sown by the Hornsby-Leake drill showed signs of lodging. By June 26th the corn in both sets had become considerably lodged; that sown by the Hornsby-Leake drill being the worst in this respect. The corn was harvested on August 3rd, at which time the Hornsby-Leake strips were nearly flat on the ground and most difficult to cut; the other strips, though also lodged, were not quite so bad.

The strips to be harvested for experimental purposes were measured off in 80-yard lengths. The headlands were cut out separately. The lines of corn adjacent to the blank spaces, caused by stopping up the coulters, were cut out and discarded, leaving a width of nine rows of corn to be harvested in each strip. With the machine used for cutting these strips it was not found convenient to cut the nine rows at one time; consequently, five lines were cut first, and then the four remaining lines were cut. The sheaves off each strip were marked, drawn in and threshed separately, as is done in the case of the half-drill strip experiments. The weight of grain produced by each strip is shown in Table IV. The difference between the weights of the two sets of strips is very small, but slightly in favour of those sown with the Force-Feed drill. The result is unreliable, because there is hardly any doubt

but that the difference is in a large measure due to the lodging of the strips sown by the Hornsby-Leake drill. It was evident also that with the high condition of the soil and the favourable weather after the corn started to grow, the rate of seeding by both machines was too heavy, and especially so in the case of the Hornsby-Leake drill. Further investigation will be necessary in this connection.

TABLE IV.

WEIGHT OF GRAIN PER STRIP OF 80 YARDS LONG.

<i>Hornsby-Leake Drill</i>			<i>Force-Feed Drill.</i>		
	Sts.	lb.		Sts.	lb.
	3	13½		3	6
	4	0½		3	11½
	3	13½		4	5
	4	4		4	0½
	4	2		4	3½
	4	3		4	10
	4	13		4	10
	4	9		4	6½
	4	2½		4	4
	4	6		4	7
	4	3½		4	11½
	4	9½		4	9½
	3	13		4	8½
	5	1		4	4½
	4	3½		4	13
	4	9		4	5½
	4	6½		4	8
	4	4		5	5½
	4	9		4	10
	4	13		4	7
	4	11		5	2
	4	7½		5	0
Total	97	3½	Total	99	9
Average	4	5.8	Average	4	7.4

*Small Scale Quantitative Experiments.**A.—Variety Experiment.*

This experiment was carried out in the New Cage at Ballinacurra. The following varieties were included :—

Spratt-Archer 37, No. 3; Archer-Goldthorpe-Spratt 1/7/2/3; Abed Rex x Spratt-Archer, 6/3/2; Spratt-Archer, 37/18 x Goldthorpe-Spratt, 18/1/2/3; Hybrid No. 4, B. 1; Spratt-Archer 37, No. 3 x July six-rowed, No. 13; Spratt-Archer 37, No. 3 x July six-rowed, No. 26; Spratt-Archer 37, No. 4 x July six-rowed, No. 1.

The experiment was laid out in three blocks, each block consisting of five rows, and each row containing one plot of each of the eight varieties; the whole arrangement being one of "balanced randomness." A short summary of the results obtained is given in Table IV. Hybrid No. 4, B. 1, again produced a relatively high yield as in 1931, but its malting quality, as gauged by nitrogen content, was not quite so good; nevertheless, it was only surpassed in this respect by the control variety—Spratt-Archer 37, No. 3. While four other varieties gave a higher yield than the control, they also contained a higher percentage of nitrogen, and one especially, namely, Spratt-Archer 37, No. 3 x July six-rowed No. 13, contained such a high percentage as to rule it out from further consideration.

Nos. 7 and 8 of this table, while being no better or inferior in point of yield to the control, also are rejected on account of their high percentage of nitrogen.

TABLE IV.

Summary—Average of 15 Plots.

	Variety	Average yield in grammes	Average percentage of nitrogen
1	Hybrid No. 4, B. 1	174	1.65
2	Abel Rex x Spratt-Archer, 6/3/2	173	1.68
3	Spratt-Archer x Goldthorpe-Spratt, 1/2/3	172	1.65
4	Spratt-Archer 37 No. 4 x July 6 rowed No. 1	167	1.65
5	Spratt-Archer 37, No. 3 x July 6 rowed No. 13	157	1.81
6	Spratt-Archer 37, No. 3	153	1.55
7	Spratt-Archer 37, No. 3 x July 6 rowed No. 20	153	1.78
8	A.G.S. 1/7/2/3	151	1.77

B.—Treatment Experiment.

This experiment was carried out in the Old Cage with four dry dressing fungicide powders. The object of the experiment was to ascertain the effect of the different dressings upon the germination of the seed, the growth and final yield of the plants produced, and also on the ability of these dressings to suppress Net Blotch, better known as stripe disease (*Helminthosporium*).

The dressings used were Ceresan, Abavit, Agrosan G. and 413A.

There were 75 plots, *i.e.*, fifteen control plots and fifteen plots treated with each of the dressings; the plots were sown in three groups; each group contained five replications of each dressing, the plots being sown five abreast. The relative positions of the plots of each dressing in each group varied, and the positions were so arranged that no two plots of any one dressing ever came in the same line in either direction.

Observations were made periodically throughout the growing period, but no noticeable differences could be observed. That the dressings did not control Net Blotch may be accounted for by the intermingling of the untreated

with the treated plots and the presence of other untreated barley in close proximity, all of which were likely to be sources of secondary infection.

A brief summary of the results is set out in Table V., where it will be seen that there are no significant differences between the control plots and those of the different treatments with regard to their effect on the germination or growth of the plants. As regards grain weight, the plots sown with the Ceresan treated seed yielded somewhat higher than the average, while those sown with the Abavit treated seed yielded somewhat lower. Ceresan again seemed to encourage the growth of straw, in fact all the other treatments seemed to encourage the production of straw, though to a less extent than the Ceresan compared with the Control.

TABLE V.

Summary—Average of 15 Plots.

Treatment	No. of Plants	No. of Ears	Ear Weight	Straw Weight	Grain Weight
Ceresan	87	171	169	243	132
413A	85	160	171	233	127
Agrosan G. ..	89	166	163	229	127
Control	86	163	164	217	127
Abavit	87	157	161	240	123

Half-Drill Strip Experiments.

There were two of these experiments carried out on the farm of Mrs. O'Brien, Loughatalia, Ballinacurra. No. 1 experiment was conducted with Spratt-Archer 37, No. 3, and Hybrid No. 4, B.2 No. 2 experiment was conducted with two generations of Spratt-Archer 37, No. 3, in order to ensure that the desirable qualities are being maintained.

The principle on which these experiments are carried out has been explained in detail in previous reports, and, briefly, it consists of a series of strips of each variety, each strip consisting of two half-strips or widths of the corn sowing drill; one half strip being sown when the machine is going in one direction and the other half strip being sown on the return journey. The strips as harvested are all of equal length, each half-strip being harvested and threshed separately. In each experiment there were twenty-two of these half strips of each variety, and the figures given in Table VI. are the averages of the twenty-two. From the figures in this table it will be seen that in No. 1 experiment the Hybrid No. 4, B. 2, was definitely inferior to Spratt-Archer 37, No. 3, both as regards yield and malting quality.

In No. 2 experiment the difference between the two generations of Spratt-Archer 37, No. 3, was so slight that they may be regarded as identical, which, of course, is as it should be.

TABLE VI.

	No. 1 EXPERIMENT		No. 2 EXPERIMENT	
	S.A. 37 No. 3	Hybrid No. 4, B. 2	S.A. 37 No. 3, Field Plot	S.A. 37, No. 3, 2nd Pedigree
Moisture, per cent.	15.2	15.3	14.7	14.7
Weight of 1,000 corns	30.8	35.2	31.2	32.2
Nitrogen per cent.	1.38	1.52	1.42	1.41
Yield in lb.	28.6	26.5	28.7	28.8

OATS.

A.—*Single Plant Selection.*

In 1932 a nucleus of pure line Black Tartary was obtained from the Plant Breeding Department of the Albert Agricultural College, Glasnevin, and sown as a garden plot. From this plot a single plant was selected, and the produce of this plant was sown this season as a single line; the produce of the remainder of the plot was grown as a field plot.

B.—*Field and Extension Plots.*

A small quantity of a new variety of oat, called "New Black," was also obtained from the Albert Agricultural College and grown as a field plot.

The following varieties were grown on the farm of Messrs. J. H. Bennett, Ltd., at Ballinacurra :—

Black Tartary	$\frac{1}{4}$ statute acre.
New Black	$\frac{1}{6}$ "
Sandy	$\frac{1}{2}$ "
Failte	1 "
Black Tartary	1 "
Victory II.	$\frac{3}{4}$ "

The plot of Sandy oats was divided into two equal plots of $\frac{1}{2}$ acre each; the seed for sowing one of these plots was dressed with Ceresan powder. Careful observation was kept on these plots throughout the growing period. There was no significant difference between the plants on the plots until after they came into ear, when it was noticed that there were not so many smutted heads amongst the plants treated, but in both the plants were badly infected; and it was quite evident that while Ceresan may be a deterrent, it is not a cure for Smut disease in oats.

C.—*Department's Extension Plots.*

These were grown on the following farms :—

VICTORY II.

Cornelius Fitzgerald, Heamont, Carrigtwohill, Co. Cork	..	14	st. acs.
J. Reilly, Ballinabointra, Carrigtwohill, Co. Cork .. ..	..	4	..
J. Deasy, Barryscourt, Carrigtwohill, Co. Cork .. ..	..	7	..
D. Mulcahy, Ballintubber, Carrigtwohill, Co. Cork .. ..	..	9	..
*Mrs. Tait, Hermitage, Rostellan, Co. Cork .. ..	..	6	..
<hr/>			
Total	40	st. acs.

FAILTE.

*Richard Barry, Leadington, Lisgoold, Midleton, Co. Cork	..	7	st. acs.
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The produce of these plots, where suitable, will be distributed as foundation stocks to merchants and others interested in the seed oat business.

D.—*County Extension Plots.*

Seed Oats for County Extension Plots were distributed in previous years through Agricultural Instructors to farmers who were prepared to dispose of the produce for seed purposes. In order, however, to give seed merchants who have been in the habit of importing seed oats an opportunity to get their requirements grown in the Saorstát, it was decided to distribute "foundation" stocks of pure line seed to such of them as were prepared to propagate these stocks. It is hoped that the bulk of the produce will be used, not for ordinary seed purposes, but rather that the firms concerned will have it propagated again in 1934, and so have available, after the harvest of that year, supplies of home-grown seed sufficient for their requirements.

It is also hoped that it will be possible each succeeding year to allocate "foundation" stocks of pure line seed of suitable varieties to reliable firms, who will be prepared to propagate it in accordance with the terms of the scheme.

The following varieties and quantities were distributed from the Department's Cereal Station, Ballinacurra, Co. Cork :—

VICTORY II.

			Stones
Ballaghaderreen Co-op. Agricultural Society, Co. Roscommon	..	70	
John P. Hopkins & Sons, Ltd., Wicklow .. ..	..	140	
D. McInerny, Skam Mills, Ennis, Co. Clare .. ..	..	70	
J. M. Reidy, Main St., Killarney, Co. Kerry .. ..	..	70	

* The seed sown at these centres was obtained from the Albert Agricultural College, Glasnevin, Dublin,

	Stones
F. A. Waller & Co., Ltd., Banagher, Offaly	238
J. & G. Boyd, Ltd., Limerick	70
Co-op. Society, Mount Bellew, Woodlawn, Co. Galway	56
Bandon Milling Co., Bandon, Co. Cork	70
John Atkins & Co., Clonakilty, Co. Cork	70
J. Callaghan & Sons, Glanworth, Co. Cork	70
Shelbourne Co-op. Society, Campile, Co. Wexford	140
M. Sheil & Son, Bagenalstown, Co. Carlow	70
Enniscorthy Agricultural Society, Enniscorthy, Co. Wexford	70
Connor Reilly, Main Street, Cavan	70
John Burke & Sons, Kanturk, Co. Cork	70
Latchford & Sons, Tralee, Co. Kerry	70
D. E. Williams, Ltd., Tullamore, Offaly	210
Minch, Norton & Co., Ltd., Athy, Co. Kildare	280
M. Kelliher & Sons, Tralee, Co. Kerry	70
McKenzies, Camden Quay, Cork	112
P. Walsh, Glanworth, Co. Cork	70
Loc Garmain Agricultural Society, Ltd., Wexford	70
C. F. Bellew, Drogheda, Co. Louth	70
S. Malone, Tullow, Co. Carlow	70
K. Williams & Co., Ltd., Dungarvan, Co. Waterford	70
John Bolger & Co., Ltd., Ferns, Co. Wexford	140
Co-op. Agricultural Society, Callan, Co. Kilkenny	140
E. Flahavan & Sons, Kilnagrange Mills, Kilmaethomas, Co. Waterford	196
Ardfinnan Co-op. Society, Cahir, Co. Tipperary	112
Bride Valley Stores, Ltd., Tallow, Co. Waterford	70
M. J. Cummins, Ltd., Mullingar, Co. Westmeath	70
A. Maloney & Sons, Ltd., Dungarvan, Co. Waterford	70
J. Cox & Co., Ltd., Dundalk, Co. Louth	70
Sutton's, Ltd., South Mall, Cork	140
A. Farrell, Main St., Longford	126
Total	3,570
	or 255 barrels.

BLACK TARTARY:

	Stones
John P. Hopkins & Sons, Wicklow	140
F. A. Waller & Co., Ltd., Banagher, Offaly	140
J. M. Reidy, Main St., Killarney, Co. Kerry	70
Shelbourne Co-op. Society, Campile, Wexford	140
J. Atkins & Co., Ltd., Dunmanway, Co. Cork	70
M. L. Potter & Co., High Street, Kilkenny	140
Latchford & Sons, Ltd., Tralee, Co. Kerry	70

	Stones
Bride Valley Stores, Ltd., Tallow, Co. Waterford	70
A. Maloney & Sons, Ltd., Dungarvan, Co. Waterford	70
Mrs. A. Somers, Coolgreaney, Gorey, Co. Wexford	49
Total	959
	or 68½ barrels.

In addition to the above quantities the Department distributed through Agricultural Instructors to farmers in districts in which it was not possible to find merchants willing to operate the new scheme, and to their Agricultural Schools at Athenry, Ballyhaise and Clonakilty, various small lots of Victory II., amounting to 378 stones, or 27 barrels.

The Albert Agricultural College, Glasnevin, County Dublin, co-operated with the Department in the working of the foregoing scheme, and the following varieties and quantities of seed oats were distributed from this Station to merchants in various counties.

<i>Failie.</i>	Stones
M. Sheil & Son, Bagenalstown, Co. Carlow	70
Minch, Norton & Co., Ltd., Bagenalstown, Co. Carlow	140
Total	210
	or 15 barrels.

<i>Glasnevin Sonas.</i>	Stones
Thos. McKenzie & Co., Pearse St., Dublin	70
D. McInerney, Mill Rd., Ennis, Co. Clare	70
Co-operative Agricultural Society, Ltd., Ballaghaderreen, Co. Roscommon	70
J. & G. Boyd, Ltd., Limerick	126
Patrick Brady, Main St., Elphin, Co. Roscommon	70
Minch, Norton & Co., Ltd., Bagenalstown, Co. Carlow	420
Molloy Bros., Castle St., Roscommon	70
P. W. Shaw & Co., Ltd., 36 Pearse St., Mullingar, Co. Westmeath	140
A. J. M. Reeves, Athgarvan Maltings, Newbridge, Co. Kildare	70
J. H. Cox, Shamrock House, Boyle, Co. Roscommon	70
Total	1,176
	or 84 barrels.

In addition to the above quantities the Albert Agricultural College distributed through Agricultural Instructors and direct to farmers in districts in which it was not possible to find merchants willing to operate the new scheme, various lots of Glasnevin Sonas amounting to 1,638 stones, or 117 barrels.

POTATOES *versus* SWEDES IN THE RATION OF DAIRY COWS.

Experiment conducted by P. CONROY, B.Sc.(Agr.), N.D.A., Instructor in Agriculture, County Westmeath.

With a view of obtaining some information as to the suitability of potatoes as a substitute for swedes in the ration of dairy cows, an experiment was conducted during the winter 1933 by the Agricultural Instructor, County Westmeath, at the Hospital Farm, Mullingar, through the courtesy of the Resident Medical Superintendent, Dr. Gavin.

For the purpose of the experiment, twelve freshly calved cows of the Shorthorn type as nearly equal as possible in milk yield were selected and fed for a short preliminary period on a daily ration per head of:—

14 lb. Meadow Hay.

4 st. Pulped Swedes.

6 lb. Crushed Oats.

2 lb. Bran.

2 lb. Decorticated Cotton Cake.

For the purpose of this report, this ration will be referred to as the "Standard Ration."

A record was made of the milk yield of each cow during the preliminary period, and it was found to average approximately $3\frac{1}{2}$ gallons daily.

At the end of the preliminary period the cows were divided into two groups of 6 each—an experimental group numbered 1–6, and a control group numbered 7–12 inclusive, and placed on trial for a period of 12 weeks which was divided into four periods of three weeks each. During the whole 12 weeks of the trial the control group was fed on the "Standard Ration," at the same rate as in the preliminary period.

The cows in the experimental group received similar feeding to the control group during the first and third periods of the trial, but during the second and fourth periods these cows had the pulped swedes of the "Standard Ration" replaced by raw, pulped unwashed potatoes at the rate of 1 part of potatoes for 2 parts of swedes. The other foods in the "Standard Ration" remained unchanged. The cows were weighed individually at the start of the experiment and again at the end of each three weeks period; and a record of the milk yield of each cow was made morning and evening during the trial. Full particulars of these weights are given in the following tables:—

TABLE I.—FIRST PERIOD.

In this table are given figures representing the weekly milk yield in lb. of each cow as well as those representing the total yield of each group during the first period when all the cows were fed on the "Standard Ration."

GROUP I. (EXPERIMENTAL).				
Cow No.	MILK YIELD			
	First week	Second week	Third week	Total
	lb.	lb.	lb.	lb.
1	262½	219	253½	735
2	189	257½	299½	746
3	250½	262½	242	755
4	257	260½	245	762½
5	247½	259	265	771½
6	235	237½	249	721½
	Total, Group I. for 1st period			4,491½

GROUP II. (CONTROL).				
Cow No.	MILK YIELD			
	First week	Second week	Third week	Total
	lb.	lb.	lb.	lb.
7	216½	242½	243	702
8	237½	248	261½	747
9	239½	245	224½	709
10	259	269	284	812
11	207½	278½	292	778
12	235	231½	235½	702
	Total, Group II. for 1st period			4,450

Figures representing Yields during second period when the cows in Group I. were fed with potatoes instead of Swedes are shown in Table II.

TABLE II.—SECOND PERIOD.

GROUP I. (EXPERIMENTAL).				
Cow No.	MILK YIELD			
	First week	Second week	Third week	Total
	lb.	lb.	lb.	lb.
1	253½	266	256	775½
2	298	289½	280	867½
3	251	240	236½	727½
4	244½	255½	244½	744½
5	257	246½	250	753½
6	243½	245½	243	732
	Total, Group I. for 2nd period			4,600½

GROUP II. (CONTROL).

Cow No.	MILK YIELD			
	First week	Second week	Third week	Total
	lb.	lb.	lb.	lb.
7	236 $\frac{1}{2}$	225	231 $\frac{1}{2}$	693
8	248 $\frac{1}{2}$	260	253 $\frac{1}{2}$	762
9	224	209	205	638
10	259 $\frac{1}{2}$	271 $\frac{1}{2}$	264 $\frac{1}{2}$	795 $\frac{1}{2}$
11	287	288 $\frac{1}{2}$	289	864 $\frac{1}{2}$
12	227 $\frac{1}{2}$	233 $\frac{1}{2}$	225 $\frac{1}{2}$	686 $\frac{1}{2}$
	Total, Group II. for 2nd period			4,439 $\frac{1}{2}$

TABLE III.—THIRD PERIOD.

During this period both groups received similar feeding.

GROUP I. (EXPERIMENTAL).

Cow No.	MILK YIELD			
	First week	Second week	Third week	Total
	lb.	lb.	lb.	lb.
1	240 $\frac{1}{2}$	253	260	753 $\frac{1}{2}$
2	283 $\frac{1}{2}$	277	282 $\frac{1}{2}$	843
3	242 $\frac{1}{2}$	239 $\frac{1}{2}$	234	716
4	242	240	237 $\frac{1}{2}$	719 $\frac{1}{2}$
5	254	250 $\frac{1}{2}$	251	755 $\frac{1}{2}$
6	221 $\frac{1}{2}$	224	237	682 $\frac{1}{2}$
	Total of Group I. for 3rd period			4,470

GROUP II. (CONTROL).

Cow No.	MILK YIELD			
	First week	Second week	Third week	Total
	lb.	lb.	lb.	lb.
7	220	223	225	668
8	230 $\frac{1}{2}$	240 $\frac{1}{2}$	239	710
9	197 $\frac{1}{2}$	195	201	593 $\frac{1}{2}$
10	255 $\frac{1}{2}$	237 $\frac{1}{2}$	243	736
11	278 $\frac{1}{2}$	278	280	836 $\frac{1}{2}$
12	216	215	202	633
	Total of Group II. for 3rd period			4,177

TABLE IV.—FOURTH PERIOD.

In this period Group I. again received the ration where potatoes replaced the Swedes of the "Standard Ration."

GROUP I. (EXPERIMENTAL).				
Cow No.	MILK YIELD			
	First week	Second week	Third week	Total
	lb.	lb.	lb.	lb.
1	252	245	238½	735½
2	273	269½	256	798½
3	233	233	236	702
4	238	236	231½	705½
5	249	237	226½	712½
6	220	221	220½	661½
	Total for Group I. for 4th period			4,315½

GROUP II. (CONTROL).				
Cow No.	MILK YIELD			
	First week	Second week	Third week	Total
	lb.	lb.	lb.	lb.
7	219	215	208	642
8	246	247	225	718
9	182	184	168	534
10	248	243	227	718
11	264	263	253	780
12	182	183	171	536
	Total for Group II. for 4th period			3,928

Comparing the yields of milk of the two groups of cows, we find that :—

Group I. (Experimental) produced, in periods I.
and III., a yield of 8,961½ lb.
And in period II. and IV. a yield of .. 8,916 ..
While Group II. (Control) produced in periods
I. and III. a yield of 8,627 ..
And in periods II. and IV. a yield of .. 8,367½ ..

That is, in the periods while both lots were being fed on the "Standard Ration," Group I. produced 334½ lb. more milk than Group II., and in the periods when potatoes were substituted for Swedes the group yielded 548½ lb. more than Group II. These results confirm what has already been fairly commonly known amongst dairy farmers, viz., that potatoes can be used with advantage to replace Swedes in the ration for dairy cows

when substituted at the rate of 1 part potatoes for 2 parts of Swedes. Considering the composition of these foods, it would seem as if the cows in Group I. were favoured somewhat by the amount of dry matter which they received.

The potatoes used in this trial were composed almost entirely of second grade Kerr's Pink with a small proportion of Arran Banner.

TABLE V.

Showing the weights of the individual cows at the start of the experiment and at the end of each of the four periods composing the trial.

GROUP I.					
Cow No.	Initial weight.	Wt. at end of first period.	Wt. at end of second period.	Wt. at end of third period.	Wt. at end of fourth period.
	cwt. qr.	cwt. qr.	cwt. qr.	cwt. qr.	cwt. qr.
1	10 1	9 1	9 2	10 1	10 0
2	9 1	9 0	9 1	9 3	9 3
3	10 1	9 2	9 2	10 1	10 1
4	10 1	9 3	9 3	10 1	10 1
5	10 0	9 0	9 3	10 1	10 1
6	11 3	10 3	11 1	12 0	12 0
Average ..	10 1	9 2	9 3	10 2	10 2

GROUP II.					
7	11 3	11 2	11 1	11 3	12 1
8	9 2	9 1	9 1	9 2	9 1
9	14 1	13 3	13 2	13 3	13 3
10	11 0	10 2	10 1	10 3	10 3
11	11 3	11 3	11 3	12 1	12 1
12	13 0	12 3	12 2	13 0	13 1
Average ..	11 3	11 2	11 1½	11 3	11 3½

These figures show the results of one trial only, and while they indicate the usefulness of potatoes as a food for dairy cows it is essential that more extensive trials should be carried out before conclusions could be arrived at as to the comparative values of Swedes and potatoes in the ration for dairy cows.

FINAL FRUIT CROP REPORT, 1933.

APPLES.

Although apple trees showed a profuse amount of blossom, many of the flowers failed to set fruit, owing to the unfavourable weather conditions which restricted the activities of bees and other insects in bringing about fertilization. Sufficient flowers set, however, to produce on the whole a good crop of highly coloured, well flavoured fruit, superior in quality to any apples produced in the Saorstát for a long number of years.

At 111 centres, out of a total of 156 from which reports were received, the crop was reported on as being average or above average. These reports indicated that, owing to the continued drought, the fruit ripened from 10—20 days earlier than usual. The varieties Bramley Seedling and Newton Wonder produced variable results—good in a limited number of districts and poor in a great many others. This was due to one or other of the following causes—(1) want of proper fertilization due to cold unfavourable weather at blossoming time, or (2) leaving the trees unsprayed.

The fruits produced on the trees in old orchards throughout the whole country were better than usual—this was particularly noticeable in Counties Carlow, Cavan, Dublin, Kildare, Longford and Roscommon.

In County Cavan all varieties cropped well and ripened early. Many of the fruits of both dessert and cooking apples were extraordinarily big and highly coloured.

In Counties Clare, Cork, Limerick and Tipperary the yield of fruit was hardly up to the average, but the apples were large and of good colour.

The following varieties produced excellent crops in Counties Dublin, Galway, Leitrim and Roscommon—Bramley Seedling, Crimson Bramley, Lord Derby, Lane's Prince Albert, Worcester Pearmain and Allington Pippin. In these districts other varieties, except Cox's Orange Pippin, which gave a light yield, were up to average.

Although the appearance in general in County Kildare in the early part of the season did not promise well, the crop turned out much better than was anticipated and was reported on as the best in quantity for the past five years, and the best in quality for over 30 years.

In County Kilkenny the yield from Lord Derby, Stirling Castle, James Grieve, Lady Sudley, Beauty of Bath, Rival and Lane's Prince Albert was below average, but the quality was excellent.

In Limerick early varieties bore a fair crop, but in general the yield was not above one fifth that of the previous season. The fruits, however, were large and highly coloured.

In Meath and Offaly the yield was about average, but the fruit was not so large as usual in these districts.

The apple crop in County Tipperary was, on the whole, disappointing and irregular. Bramley Seedling and Newton Wonder gave poor returns, while such varieties as Lord Derby, Bismark, Worcester Pearmain, Allington

Pippin, King Edward VII, Charles Ross, bore fair crops, and better in the eastern than in the western parts of the county.

In County Waterford the crop was under the average, especially the mid-season varieties. Grenadier and Lord Suffield were the best of the earlies, and Lord Derby and Royal Jubilee the best of the late kinds. Of the dessert apples grown in County Waterford last season, James Grieve, Charles Ross, Worcester Pearmain and Allington Pippin gave the best return.

In Wicklow apples were a very heavy crop. The fruit was large, highly coloured, free from disease and generally of a high grade. In this area Bramley Seedling produced a good crop.

While the crop in County Wexford was variable in some districts, it was, on the whole, well up to the average. The fruit on the trees in the western side of the orchards was in many cases better than that on the trees in the eastern side. The varieties Lord Derby, Lane's Prince Albert, Royal Jubilee and Grenadier were the best of the cookers—while Blenheim Orange, Allington Pippin and Beauty of Bath were the best of the dessert apples grown in County Wexford. The returns from Cox's Orange Pippin, Bramley Seedling and Newton Wonder were, on the whole, poor in most districts of the county.

PEARS.

In the early part of the season there was every indication of a heavy yield of pears, but, owing to unfavourable weather immediately after fertilization, a number of fruits dropped off, and it was then anticipated that the crop would be below average. However, as the fruits began to swell, it became evident that the crop would be better than expected. The warm weather which prevailed during summer and autumn caused the fruits to swell to above normal size and to be of better colour than for a number of years. Pear Scab was less noticeable than usual, due no doubt to the more effective spraying of the trees and to the favourable weather conditions prevailing during the summer and autumn months.

Of the 138 reports received on the condition of the crop, 100 stated that the yield was either an average or above average. Excepting in the warm districts of the south and in walled-in gardens facing south, our climate is not suited for growing pears on bush or standard trees. They usually suffer severely from the effects of cold weather when in blossom or immediately after the fruits have set. The crop in County Carlow was very good, especially William, Louise, Bon, Fertility Glou and Conference, and the fruits were large. Doyen was below the average yield in this district. In Counties Cork and Clare the early varieties did not crop well, but the late varieties produced a fair return. Glou Morceau produced very fine fruits.

In County Dublin the crop was fairly good, especially on walls, where Durondeau, Doyenne du Comice, Pitmaston Duchess, Williams Bon Chretien,

Beurre de Amanlis, Beurre Superfine and Marie Louise bore large crops. In most cases where the yield was very heavy, the fruits were smaller than usual.

In Counties Galway, Longford, Kildare and Wexford, the yield of fruit in the open was light, but trees on walls bore good crops, especially the varieties Fertility, Doyenne du Comice, Pitmaston Duchess, Margaret Marrilat, Williams Bon Chretien and Clapps Favourite. In Counties Leix, Leitrim, Roscommon, Sligo and Monaghan, the yields were below normal. Very good crops were produced in Counties Meath, Wicklow, Louth and Limerick, where most of the varieties cropped well, especially Thompson, Pitmaston Duchess, Williams Bon Chretien, Conference, Clapps Favourite, Marie Louise and Doyenne du Comice.

In County Tipperary there was a fairly good crop, but the results were variable. In some gardens, the trees carried good fruits, while in others the crop was light. Where the yields were above average, the fruit was generally smaller in size than usual.

PLUMS.

The plum crop was the outstanding feature of this year's large tree fruits. Of the 147 reports received, 119 stated that the yield was either an average or above the average for a number of years. Most of the plums flowered early, and the flowers set well, and except where the frost was severe the young fruits were not affected by the cold weather which followed. The fruits ripened about a fortnight earlier than usual. Victoria was by far the heaviest cropper, and in cases where the branches were not supported they were broken by the weight of the fruit. This crop was exceptionally heavy in Counties Cavan, Donegal, Carlow, Galway, Louth, Meath, Sligo and Tipperary.

In South County Dublin the yield of plums was below the average, but in the northern districts of the county very heavy crops were borne, the best croppers being Victoria, Czar, Purple Gage, Diamond, and Green Gage. In County Galway the yield was the best for 20 years, especially the varieties Victoria, Monarch, and Pond's Seedling.

In Counties Kerry, Kilkenny, North Monaghan, Waterford and Roscommon the crop was generally a little below the average.

In Leix there was a very good crop, especially River Kirke's, Victoria, and Coe's Emperor. Green Gages were about half a crop.

There was a very heavy crop in County Leitrim on the varieties Early Rivers, Victoria and Czar.

In south Mayo generally the yield on Victoria and Gisbornes and on old trees of Mussel and Horse Plum was good, but in the north of the county trees in the open were disappointing.

In both north and south Tipperary the crop was exceptionally good, old trees bearing better than for many years.

In County Wicklow the yield was very heavy, especially on walls, but the fruit grown in the open was not of such good quality as usual.

DAMSONS.

The yield of damsons was one of the best for many years. Of the 139 reports received only 6 stated that the crop was a bad one. In County Cavan it was the heaviest for the past 40 years, the fruits being large, well-coloured and of good flavour. A comparatively new variety called Merry-weather did well in Counties Meath and Mayo. It produces much larger fruits than either the Cluster or Bradley's King, which are the two varieties chiefly cultivated. The crop was also heavy in Counties Louth, Dublin, Kildare, Limerick, Sligo and Wicklow. In Counties Kerry, Offaly, Kilkenny, and portions of Westmeath and Tipperary, the yield was below the average, and the fruits were small in size.

CHERRIES.

The cherry crop turned out to be better than was expected early in the season. The fruit ripened earlier than usual, owing to the warm dry summer. The weather at flowering time was very favourable, with the result that the fruit set well, and the fall of small fruit during the stoning period was less than usual. Taking it on the whole, it was one of the best crops for a number of years.

In Counties Kerry, Longford, Monaghan, Waterford and Wexford the crop was below average. In north Tipperary the varieties Morello and May Duke cropped well, but in the south end of the county the sweet cherries were good and the Morello poor in yield.

There was a good crop generally in County Wicklow.

In County Mayo the varieties May Duke, Black Heart and Black Eagle cropped well.

In County Dublin there was a fair crop of Black Heart, May Duke, Napoleon, Biggareau and Morello.

PEACHES AND FIGS.

These turned out a better crop than was anticipated owing to the dry suitable season. Of the 47 reports received, all indicated a yield above the average. In general it was the best for many years. Not only did the trees bear more fruits, but the size, colour and flavour were good and much better than usual, and finished up well. In County Dublin the yield and quality of Royal George Peach, and Brown Turkey Fig was very good. There were also heavy crops in Counties Cork, Galway, Kildare, Limerick, Tipperary and Waterford and the flavour was excellent.

WEATHER.

During the early spring months the weather was extremely trying on tree fruits. The day and night temperatures varied considerably and had an injurious effect on the setting of the fruit in many places. From the middle to the end of June the cold and severe parching north-east winds

caused some dropping amongst the large tree fruits, especially where there was a heavy crop. This dropping of fruit was not so serious, however, as what usually takes place, owing to the fruits being more evenly distributed on the tree branches.

In the western counties, especially in Counties Clare, Galway, Roscommon, Limerick and Mayo, a heavy gale of extreme violence on the 30th and 31st July did much damage by blowing off many of the small apples, pears and plums, and bruising many more by beating them against each other and against the branches. Not only did it blow many of the fruits off the trees, but it also broke off many of the branches, where large trees were growing in exposed positions. Another storm on the 21st and 22nd August did considerable damage to fruit in County Limerick.

There were none of the heavy gales which usually occur towards the end of September, and blow down large numbers of the finest fruits. The great heat of the late Summer and Autumn caused early maturing of apples, pears and plums, the majority of them ripening from ten to twenty days earlier than usual; and many of the large growers of late keeping apples and pears feared that the fruit would break down in storage and not keep over the winter.

Plums also swelled up more rapidly than usual, and were ripe and fit for use at an earlier date than for the last 60 years. Owing to the very sunny season, all large fruits coloured well and were of good flavour. On the whole, it was an excellent season for the production of high quality fruit. It was one of the driest seasons on record.

In Dublin, the rainfall for the first nine months of the year was only 15.03 inches, which is roughly only about half of the normal annual rainfall. In County Meath, during the first nine months there was only 18.00 inches, which is about half the average of 36.39 inches for the last six years.

In Leix it was the longest and most severe drought for the past 60 years. During the year 1887 only 14.04 inches of rain fell in County Dublin, which is the lowest recorded since 1871. The wettest month this year in County Dublin was February, when 3.85 inches fell, and the driest was September with .43 inches or less than half an inch.

In Meath the wettest day was the 24th February, when 1.50 inches of rain fell. On light, sandy and gravelly soils the trees suffered more from drought than where the soil was heavier and of a condition to hold the moisture for a longer period.

INSECTS.

Taking the Season as a whole, insects caused much less injury to fruit and fruit trees than in past years. This was chiefly due to greater interest on the part of the growers in procuring ways and means of combating the various pests which attack our fruit trees. The habits of these insects are being studied more fully; more efficient and more easily applied spraying materials are being evolved, and superior and more powerful spraying machines and appliances are being used to combat them, and to protect

the trees and fruit against their ravages. Growers now realise that unless thorough spraying is carried out at the proper time, a good crop of clean sound fruit cannot be expected, and that much of their time and expenditure has been in vain. Considering the very warm and dry season, it is noteworthy that in general, little damage was caused by wasps, although considerable injury from their attacks was reported from Counties Louth and Wicklow. Reports received from Counties Cavan, Dublin, Laoighis, Longford and Westmeath indicated that wasps were not so numerous as usual. No reports in this connection were received from other counties.

American Blight or Woolly Aphis on apple trees was a source of trouble in Counties Cavan, Carlow, Cork, Dublin, Meath and Wicklow. This was chiefly due to the very dry weather, which is favourable for the spread of this troublesome and injurious insect pest. Mealy Aphis caused damage to plums in Counties Cavan, Dublin, Louth, Offaly and Tipperary. This is a pest which is difficult to eradicate, and should be treated immediately it is detected. The caterpillars of Ermine and Winter moths caused more or less damage by eating the leaves of apple trees in Counties Donegal, Dublin, Kerry, Kilkenny, Laoighis, Louth, Monaghan, Offaly, Roscommon and Wicklow. Capsid bugs did considerable damage to both foliage and fruit in Counties Dublin, Meath, Donegal, Kerry, Limerick, Sligo and Leitrim. Red Spider was prevalent on large fruit trees in Counties Kildare, Kilkenny, Mayo, Offaly and Wicklow. Apple Sucker caused but little trouble. Black Fly caused some damage to young cherry shoots and foliage in Counties Donegal, Dublin, Laoighis, Offaly, Tipperary and Wicklow. Apple Sawfly attacks were reported from County Roscommon, and Codlin Moth from County Wicklow.

Because of the continuous excessive drought, birds, chiefly Blackbirds and Tits, did much damage to Apples, Pears and Plums in Counties Carlow, Dublin and Wicklow.

FUNGI.

Owing chiefly to the extraordinary hot, dry summer and autumn, which to a certain extent was not conducive to the spread of fungoid diseases, and to remedial measures being taken immediately an outbreak was noticed, these diseases did not cause as much damage as in past years. Apples and pears were cleaner and not so much affected with Scab as usual. Slight attacks were reported from Counties Donegal, Dublin, Roscommon, Sligo, Waterford and Wexford. Silver Leaf, however, is slightly on the increase, and was reported from Counties Dublin, Louth, Meath and Wexford, where it attacked plums. It also attacked peaches and apples in Counties Dublin and Leix. Apple Blossom Wilt caused damage in Counties Dublin, Kerry, Sligo and Wexford. Apple and Pear Canker was chiefly to be found on old and neglected trees in Counties Kilkenny, Leitrim and Offaly, and was not so prevalent on young trees. It is being kept in check by spraying and pruning away infected branches. A case of Sunscald on apples was reported from Westmeath.

MARKETS.

There was, on the whole, a fairly good crop of early apples. Old orchards bore a heavier yield than usual, with the result that early prices were low and only apples of good quality, well graded and marketed in an attractive way, brought anything like a fair return.

Early cooking apples were a heavy crop in Northern Ireland, and large quantities of these were marketed in the Free State, with the result that the supply was more than the demand and prices were at a low level. Many of these were placed on the Irish Free State market earlier than usual in order to have them in before the Duty began to operate.

Pears were in good demand and the supply good; and well graded clean fruit sold at remunerative prices.

Plums produced a heavy crop of good clean fruit, and a large supply was marketed. The prices realised were above normal, owing to the small quantity of this fruit imported.

In the damson growing districts of Meath, Louth and Monaghan there was a very heavy yield, and as the export duty was too great to allow of them being exported, the whole crop had to be disposed of in the home market. This caused a glut, as more fruits were being exposed for sale than were in demand both by Jam manufacturers and the general public.

In County Cavan apples sold at from 2/- to 3/- per stone, according to size and quality. Pears 10d. per dozen, and plums at 8d. to 10d. per lb. Damsons were a glut and sold as low as 6/- per cwt.

In County Clare good dessert apples brought from 8d. to 10d. per dozen, and cookers 1/6 to 3/- per stone; ungraded dessert apples brought from 1/6 to 3/- per stone, and pears 9d. to 2/- per dozen, according to size and quality.

In Cork the local demand was about equal to the supply, and early desserts sold at from 5d. to 7d. per lb. Cookers realised 6/- per 100 for selected fruit, and 4/- for second grade. By the barrel they sold at from 16/- to 20/-.

In Donegal, pears brought from 2/6 to 3/- per stone; plums 1/- to 2/- per stone, and damsons 6d. to 1/- per stone.

Prices varied very much in the Dublin market; some days there was a good demand and good prices were realised; on other days, when the demand was below normal, poor prices were obtained unless the fruit was of exceptional merit.

Large supplies of early apples, chiefly Grenadier, were brought into the Irish Free State from Northern Ireland, and this brought down the price for a few weeks, but when this supply was exhausted, the prices improved. Early dessert apples brought 5/- per float, 4/- per tray and 10/- per bushel for select fruit. The price of plums was slightly lower than usual, owing to the large supply in the plum growing districts, and sold at from 4d. to 8d. per lb. Damsons were a glut in the market, and sold at from 1/6 to

3/6 per chip basket. Pears were plentiful, and being of good quality, were in great demand at from 1/- to 3/- per dozen according to quality.

In Galway ungraded apples brought 1/- to 1/6 and graded from 2/- to 2/6 per stone.

In Kerry first grade apples brought from 5/- to 8/- per 100, and plums 8d. to 10d. per lb.

In Kildare apples sold well, desserts bringing 3/- per stone, and the same price was realised for extra selected cookers.

Prices were remunerative in County Kilkenny, where the early desserts sold at 5/- per half bushel and cookers at 7/- per bushel.

In Leix cherries sold at 1/- to 1/3 per lb., graded apples at 8d. per dozen, and windfalls at 1/- per stone.

In Limerick the market was overstocked with early and mid-season apples, and stocks of late keepers were held over for later markets. Select desserts brought 9d. to 1/- per dozen; cookers were sold as low as 1/6 per stone. Preserving plums sold at from 3/- to 4/-, and damsons at from 1/6 to 2/6 per stone and 6/- to 8/- per cwt.

In Mayo good dessert apples brought 1/- per dozen, but there was a glut of poor quality cookers which sold at 1/6 to 2/- per stone.

Prices were low in Meath, owing to large supplies of early cooking apples and windfalls, and ranged around 2/- per stone, pears 4/- per stone, and damsons 2d. per lb.

In Offaly apples sold at from 1/6 to 2/- per stone, plums 8d. to 10d. per lb., pears 2/- to 4/- per dozen, and damsons 2d. per lb.

There was very little demand in Roscommon, and growers held over their fruit for better markets.

In Tipperary the demand for apples was not up to the average; first grade selling at 9d. and second grade at 6d. per dozen. Plums sold at 8d. to 5d., cherries at 9d. per lb., pears 1/- to 2/- per dozen, and damsons 2/- to 3/- per stone.

Prices were below normal in Waterford, cookers 1/9 to 3/- per stone, and dessert apples 3/- to 3/6 per stone; pears 1/- to 2/- per dozen, and plums and damsons 4d. per lb.

In Wicklow there was a good demand. Choice apples realised 1/- to 1/6 per dozen, others 2/- per stone and as high as 2/6 per tray of 12 lb.

Prices were, in general, below the average in County Wexford, and apples sold at about 5/- per 120, extras at 8d. to 10d. per dozen. Pears sold at 2d. each, and plums at 8d. per lb.

SUGAR PULP FOR DAIRY COWS.

Concurrently with the cattle fattening experiments (reported in Vol. XXXII., No. 2, of this Journal), a somewhat similar feeding experiment with sugar pulp was conducted with dairy cows. This experiment, which was designed to afford information on the suitability of sugar pulp as a concentrate in the ration for milk production, was carried out at the Department's farms at Athenry, Ballyhaise and Clonakilty during the early spring months of the years 1931, 1932 and 1933. The cows used in the experiment were carefully selected, all having calved shortly before the beginning of each experimental season, and in order to ensure that the advance of pregnancy should influence the results but as little as possible, service was postponed for some weeks. Where the date of calving permitted, those cows which by temperament and otherwise showed themselves adapted to experimental purposes were used in successive seasons for this investigation, and in a number of instances the same cows were included in each of the three seasons of the experiment. Not less than six cows were included in the experiment at each of the centres in any season, and altogether a portion of sixty-one lactations was covered by the experiment.

One group of cows only was included in the experiment at each centre, and two different rations were alternated over periods of three weeks while the experiment was in progress. The scheme of alternation adopted will be easily understood by reference to the appended diagrams showing the total milk yields. These diagrams facilitate the comparison of the yield for the different periods. In the first season the experiment was divided into five periods of three weeks each, and in the second and third seasons into four periods of the same duration. A basal ration of 14lb. hay and 30lb. roots per head daily was fed throughout the experiment. In addition a standard meal ration consisting of 2 parts crushed oats, 1 part maize meal, 1 part decorticated cotton seed meal, was fed during the first, third and fifth periods in the first season, and during the first and third periods in succeeding seasons. During the second period in all three seasons, and in the fourth period in the second and third seasons, the maize meal of the standard ration was replaced by sugar pulp in the proportion of 10 parts maize meal to 11½ parts sugar pulp, while in the fourth period of the first season half the oats also was replaced in equal proportion by sugar pulp. The proportion of the different foods included in the meal ration during the different periods in the first season is shown in the following table :—

Period.			Maize Meal. parts	Crushed Oats. parts	Sugar Pulp. parts	Cotton Seed Meal. parts
1st period ..	..	..	1	2	—	1
2nd „ ..	..	..	—	2	1.15	1
3rd „ ..	..	..	1	2	—	1
4th „ ..	..	..	—	1	2.15	1
5th „ ..	..	..	1	2	—	1

In the second and third seasons the meal portion of the ration during the different periods was as follows :—

Period		Maize Meal.	Crushed Oats.	Sugar Pulp.	Cotton Seed Meal.
1st period	..	1 part	2 parts	—	1 part
2nd „	..	—	2 „	1.15 parts	1 „
3rd „	..	1 part	2 „	—	1 „
4th „	..	—	2 „	1.15 parts	1 „

The concentrates were fed to each cow at the rate of 3½lb. of the standard ration for every gallon of milk yielded and at corresponding rates for the other rations. The milk yield on which the feeding was based was determined from the yields produced during the week or two immediately preceding each experiment, and on this yield the ration fed to each cow for the whole period of the experiment was calculated.

The concentrates were mixed together and fed dry, adequate supplies of water being provided. The cows were weighed at the beginning and end of each experimental period, and an accurate daily record of the milk yields kept. Care was exercised at all times to detect any changes in flavour or quality of the milk which might occur as a result of feeding any of the different rations. The milk yields and body weights of each cow are indicated in the accompanying graphs.

1930-31 SEASON.

At Athenry eight cows were used in the experiment which commenced on 27th January, 1931. The cows were weighed on that morning, and the experimental rations introduced on the afternoon of the same day; milk yield recording was begun on following morning. This procedure was adopted at the beginning of each period at this centre; thus the cows were weighed always on the morning of the last day of a period, the new ration introduced the same evening, and the milk yield for the new period recorded as from the following morning. At this centre the cows were out on grass by day, as weather permitted, from the beginning of the experiment, and were housed by night.

At Ballyhaise seven cows were employed in the experiment and six at Clonakilty. During the fourth and fifth periods the cows at Clonakilty were out on fair grass during the day. For the last two weeks of the fifth period they had access to good grass both night and day. No difficulty was experienced in getting the cows to take the different rations, and, so far as could be observed, the rations were equally appetising.

At Athenry one of the cows (Rosie II.) had a slight chill in March, but not sufficient to affect her milk yield to any serious extent. This was the only trouble experienced with the cows during this season or, in fact, during the whole course of the experiment.

The daily milk yield, as well as the live weight at the beginning and end of each period of each cow at the different centres, is shown graphically in

Figures No. 1 to 3, while the total milk yield for each period is shown in Figures No. 4 to 6.

No bad flavour or taste could be detected in the milk at either centre as a result of the feeding with sugar pulp.

The increase in milk yields at Athenry and Clonakilty in the fifth period is presumably due to the earlier growth of grass at these centres.

SEASON 1931-32.

During the second season of the experiment eight cows were used at Athenry and six at each of the other two centres. As already indicated, only two rations, namely, the standard and that in which the maize of the standard was replaced by sugar pulp in the proportion of 10 parts maize to $11\frac{1}{2}$ parts sugar pulp, were fed during this season. These two rations were alternated over the four periods at all centres.

All the cows remained in excellent health throughout the experiment, and, with one exception, took readily to the alternation of the rations. The exception was one of the cows at Clonakilty, which showed a temporary dislike to the sugar pulp ration. No taint or flavour could be detected from the milk at any centre.

Figures No. 7 to 9 show graphically the daily milk yield and the live weight of each cow over the period of the experiment, while the total yields are shown in the diagrams, Figures No. 10 to 12.

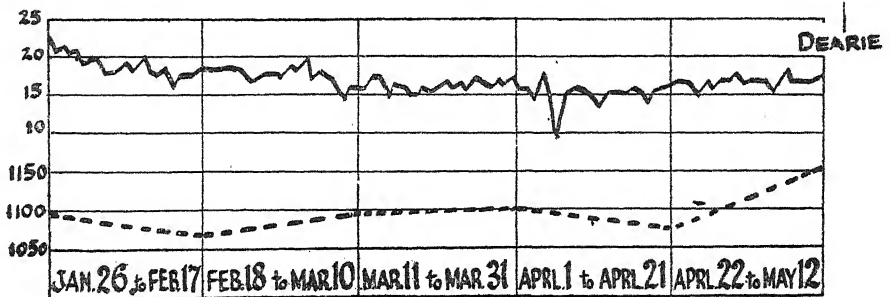
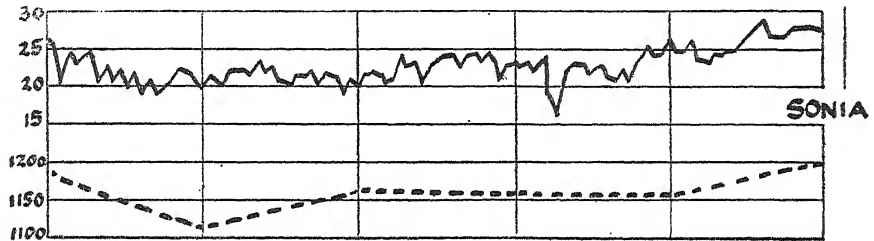
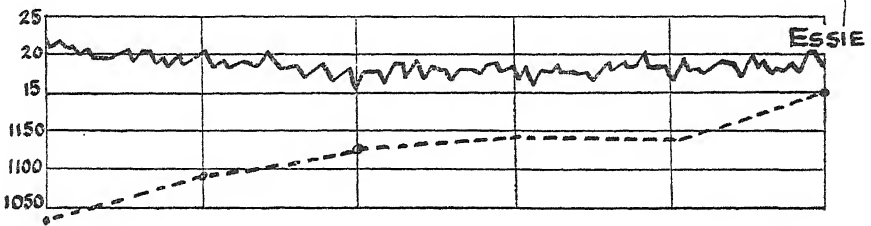
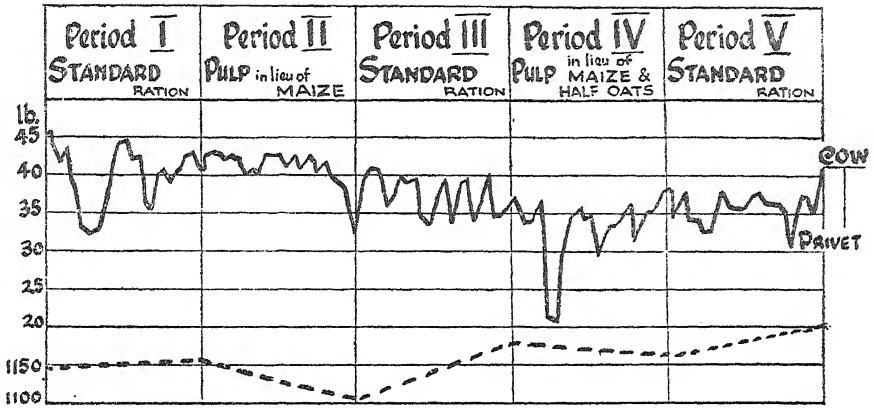
SEASON 1932-33.

The procedure during this season was exactly similar to that of the previous year, and the same number of cows was included at each centre. No difficulty was experienced in connection with the health of any of the cows, or in regard to their appetite for the different rations.

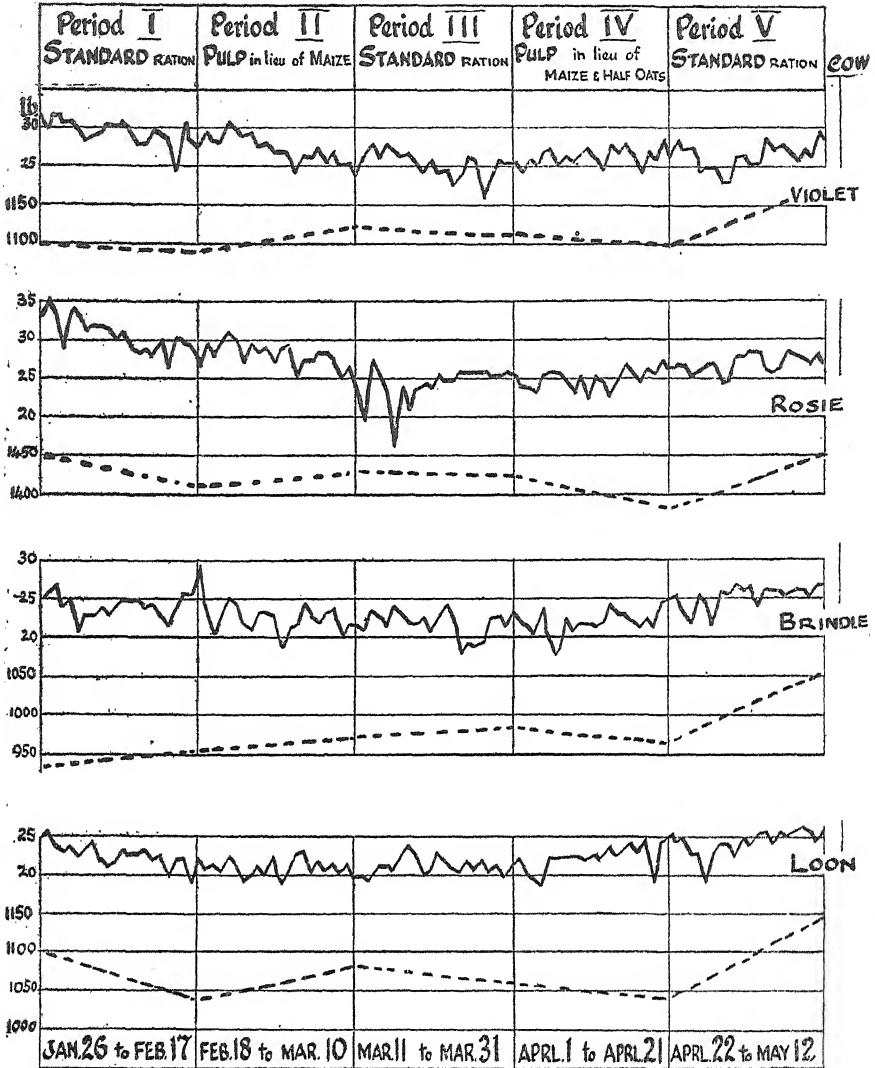
Figures No. 13 to 15 indicate graphically the daily milk yield and live weight, while the total milk yields for each period at each centre are shown in Figures No. 16 to 18.

The graphs representing the yield of milk obtained as a result of feeding the cows with a basal ration of hay and roots and the standard meal ration show no striking change compared with the graphs showing the yields produced as a result of feeding the ration in which the maize meal of the standard ration was replaced by sugar pulp.

There are no big variations between the two sets of graphs—nothing but the normal gradual falling off in yield of milk as the milking period advances, and except for a very few fluctuations in the yield of individual cows on a few occasions, due to some other influence during the trials, they are regular and such as would be expected from the use of equivalent foods in a ration. Consequently, it may be assumed, as far as could be claimed from experiments with a limited number of cows, that sugar pulp, in the proper proportions, forms a suitable substitute for maize meal, in a mixed meal ration such as that fed to the cows in these experiments.

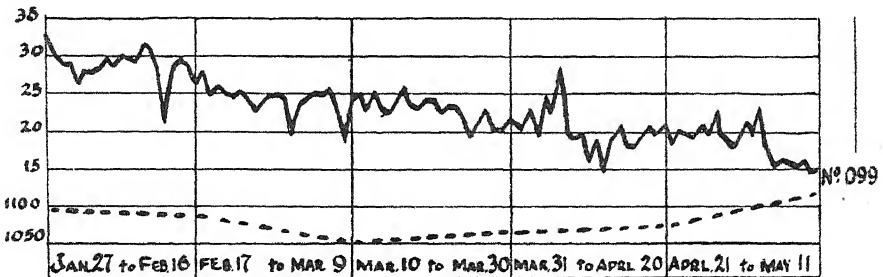
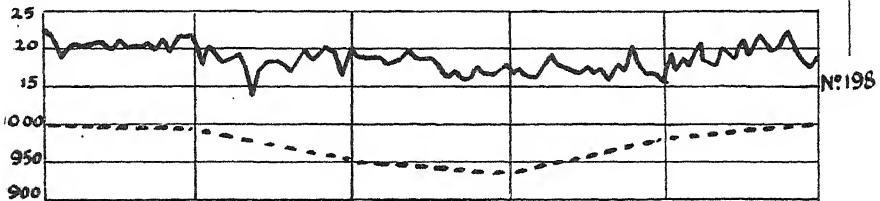
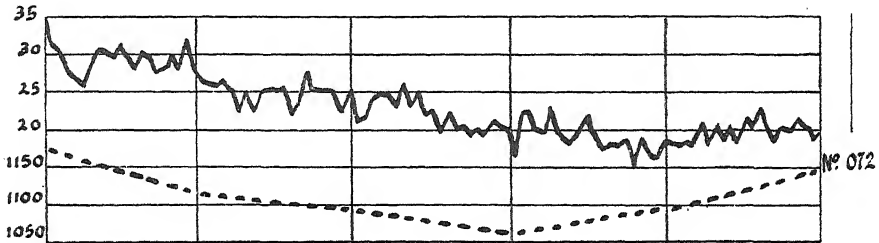
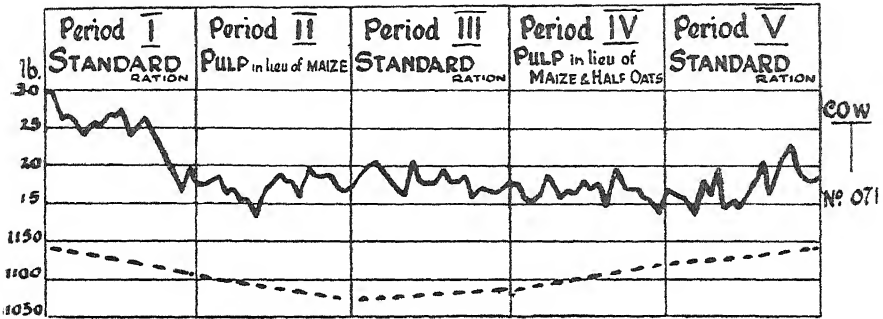


ATHENRY 1930-31 — MILK YIELD lb. --- BODY WEIGHT lb.



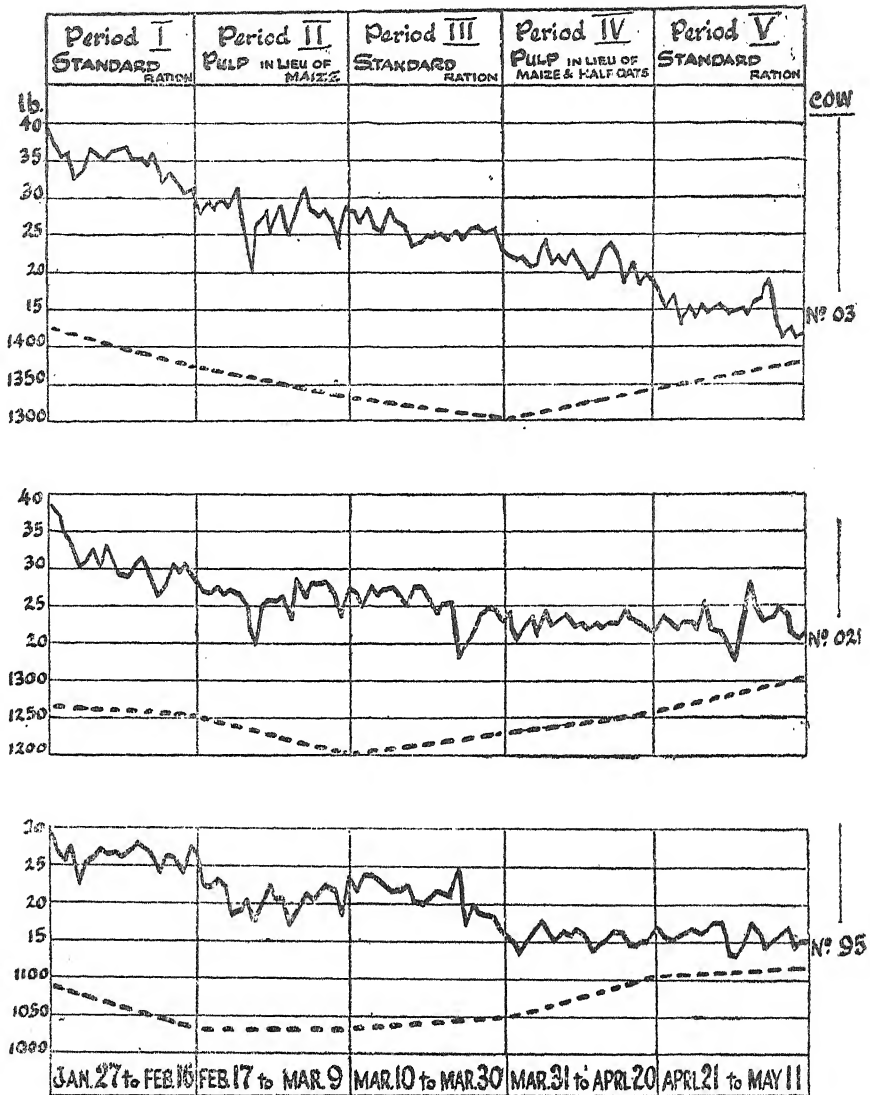
ATHENRY 1930-31 — MILK YIELD lb. --- BODY WEIGHT lb.

FIG 1.



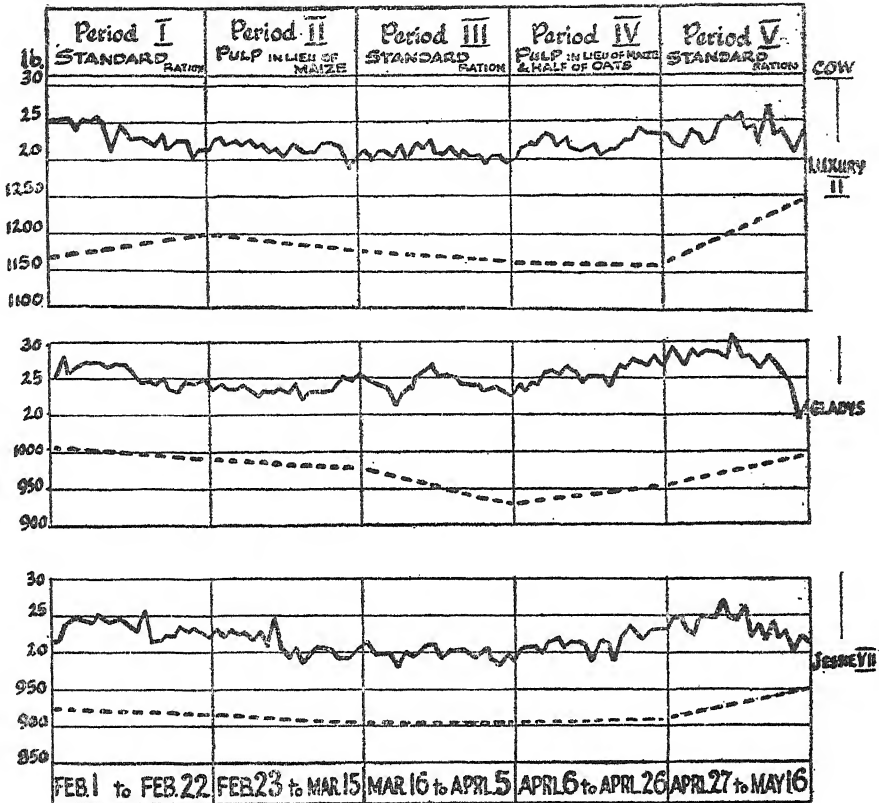
BALLYHAISE 1930-31

— MILK YIELD lb.
- - - - - BODY WEIGHT lb.



BALLYHAISE 1930-31 — MILK YIELD lb.
 ----- BODY WEIGHT lb.

FIG 2.



CLONAKILTY 1930-31 — MILK YIELD lb.
 --- BODY WEIGHT lb.

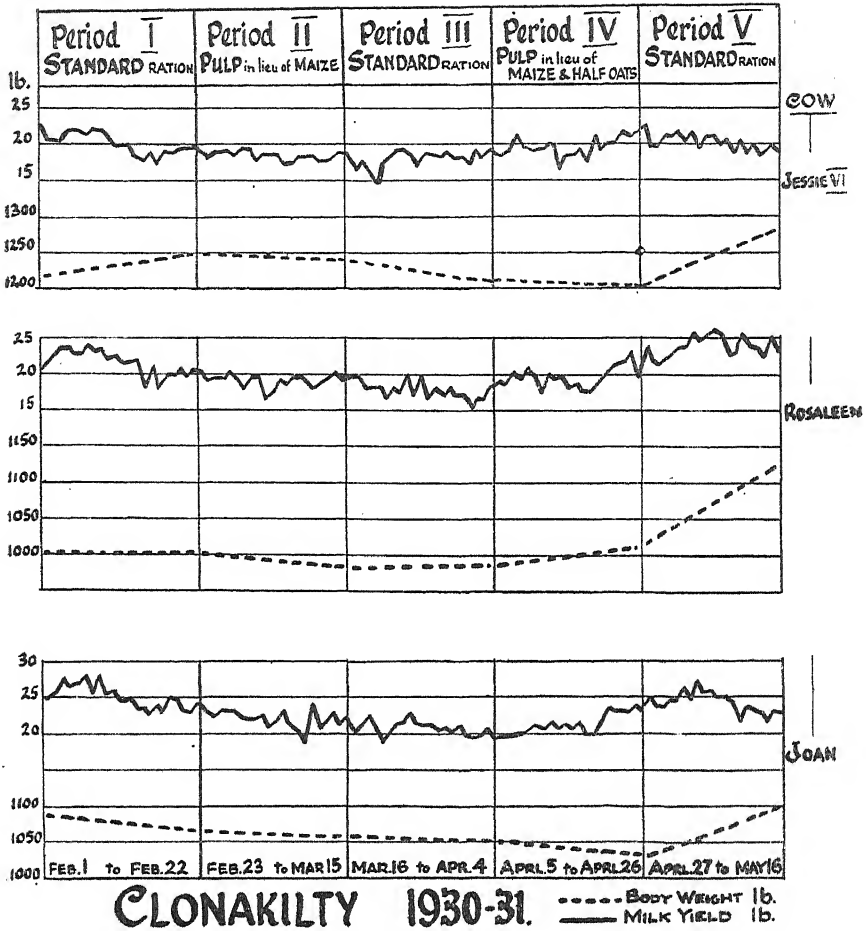
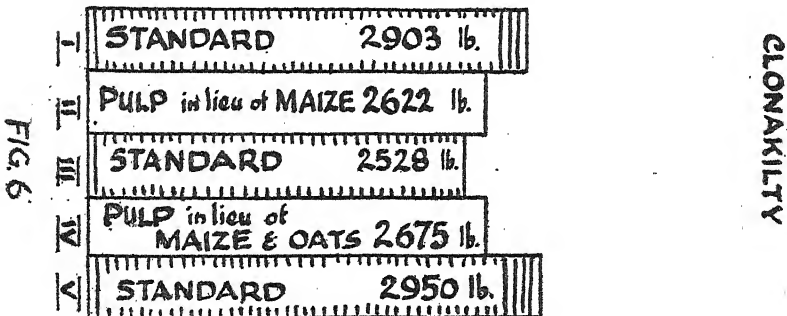
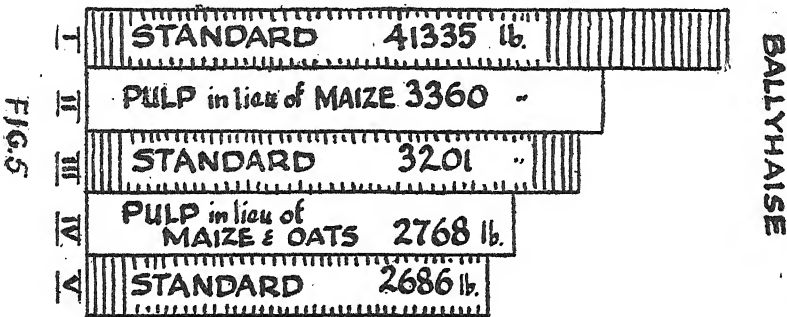
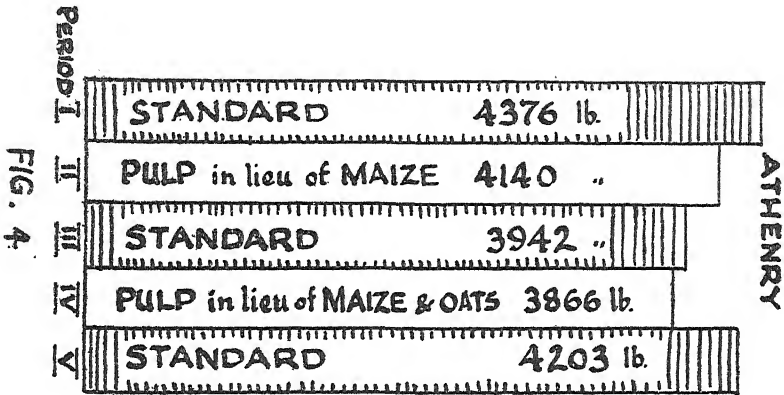
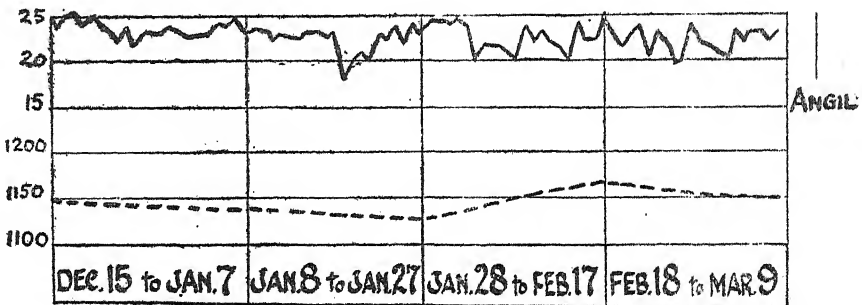
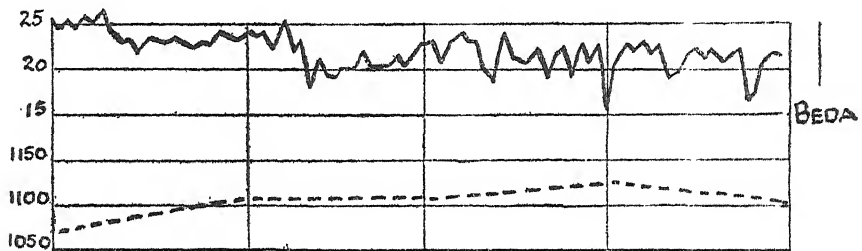
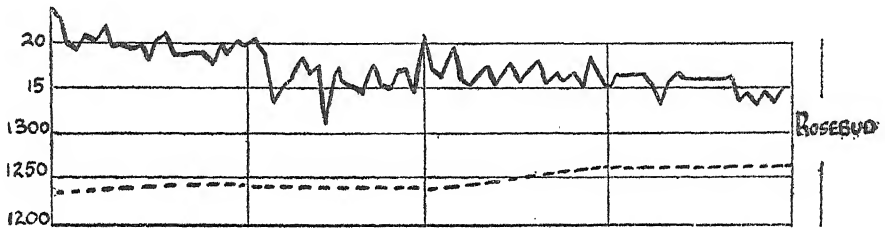
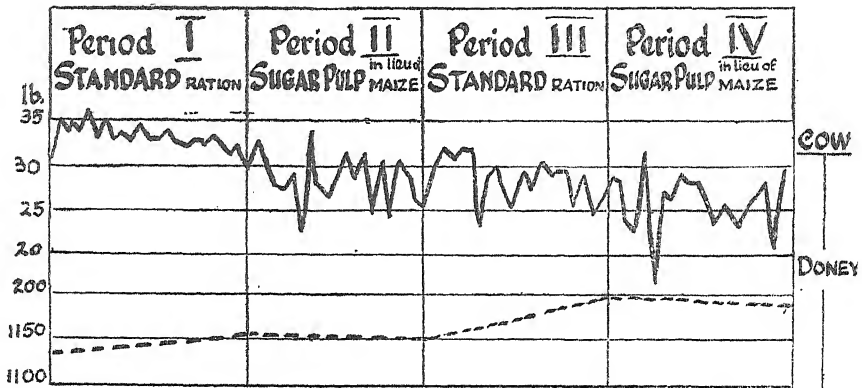


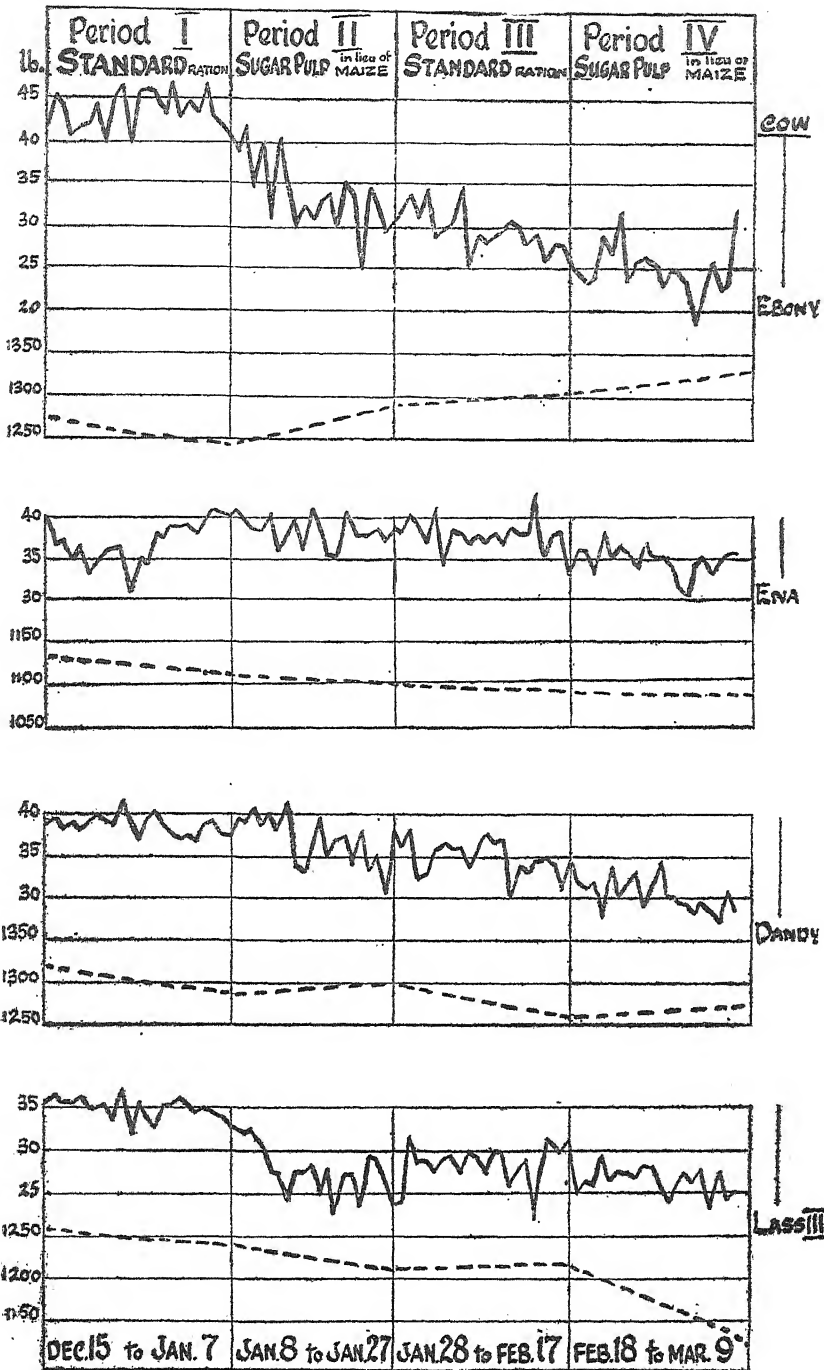
FIG. 3

DIAGRAM OF MILK YIELD ON DIFFERENT RATIOMS 1930-31.



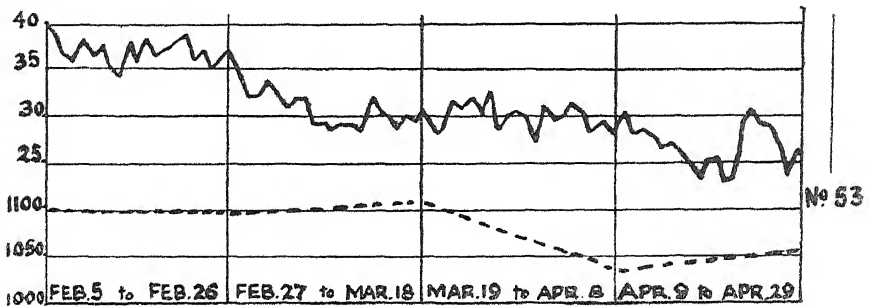
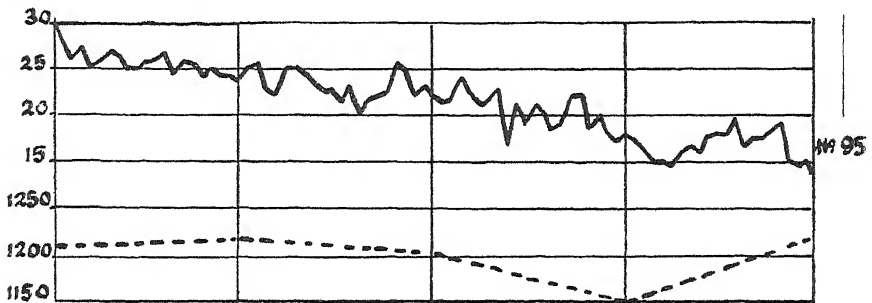
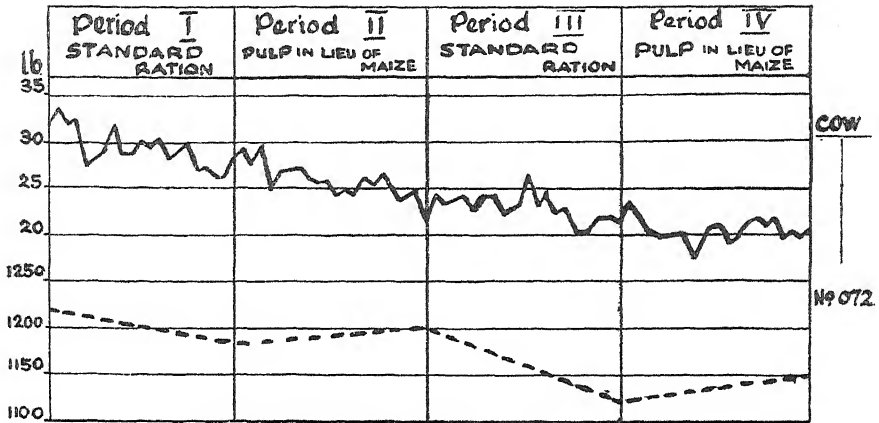


ATHENRY 1931-32 — MILK YIELD lb.
 ----- BODY WEIGHT lb.



ATHENRY 1931-32 — MILK YIELD lb.
 --- BODY WEIGHT lb.

FIG. 7



BALLYHAISE 1932 — MILK YIELD lb.
 BODY WEIGHT lb.

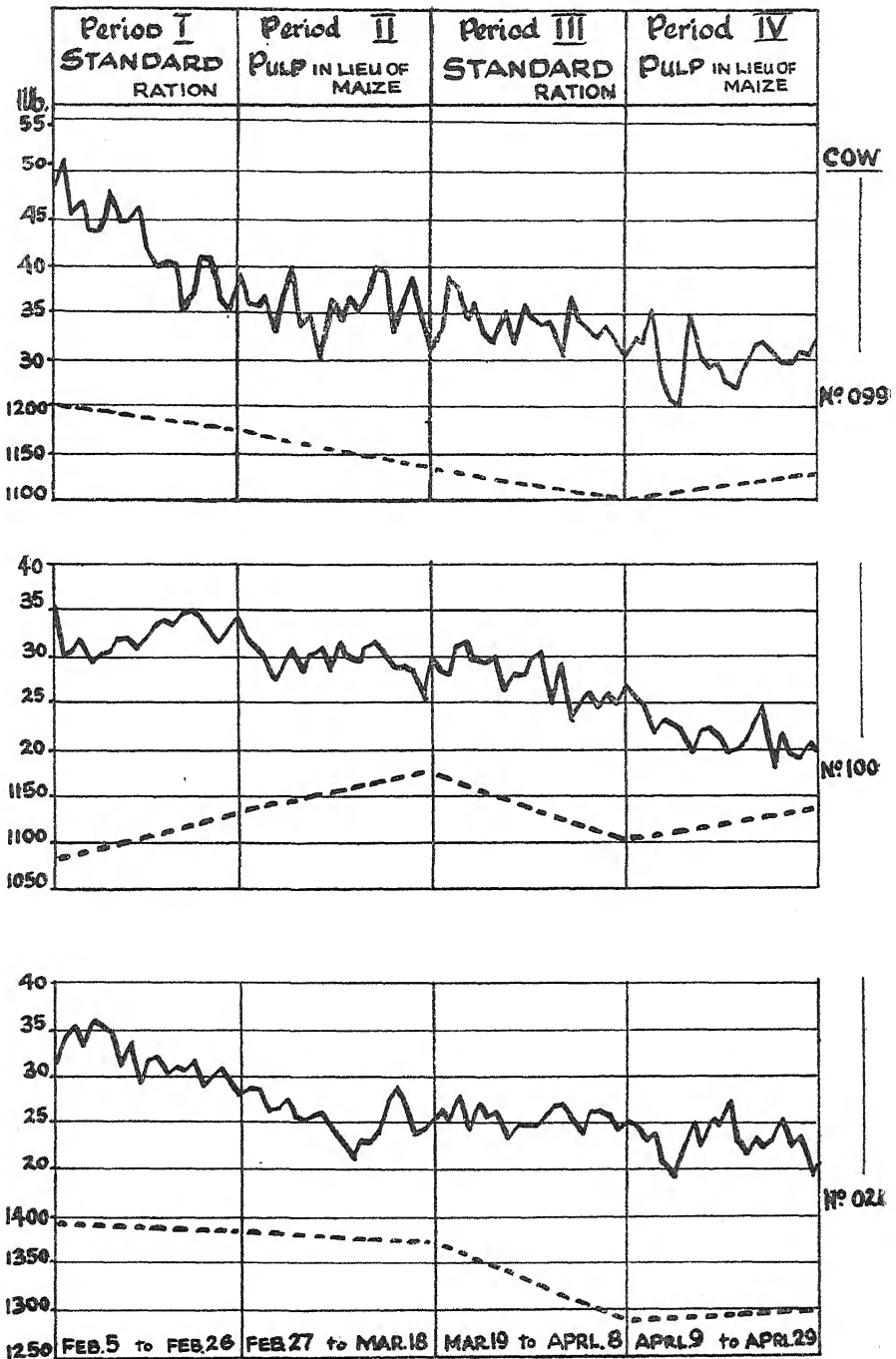
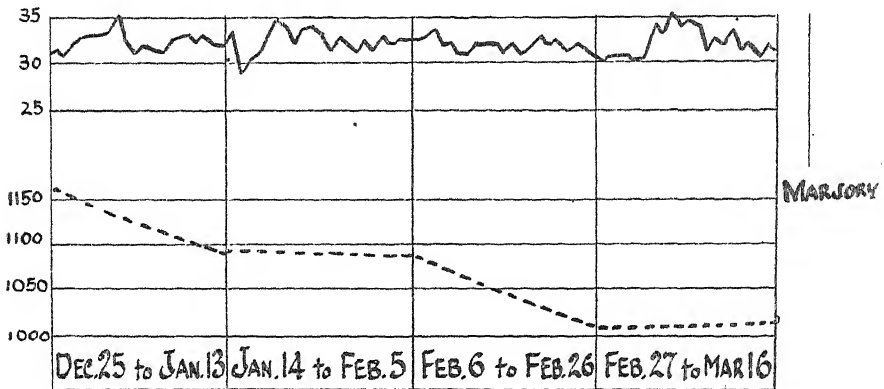
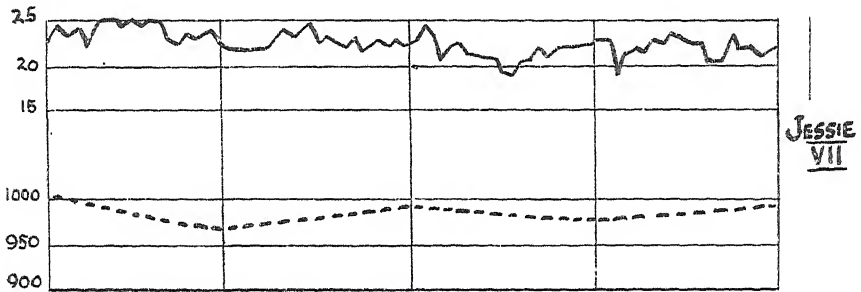
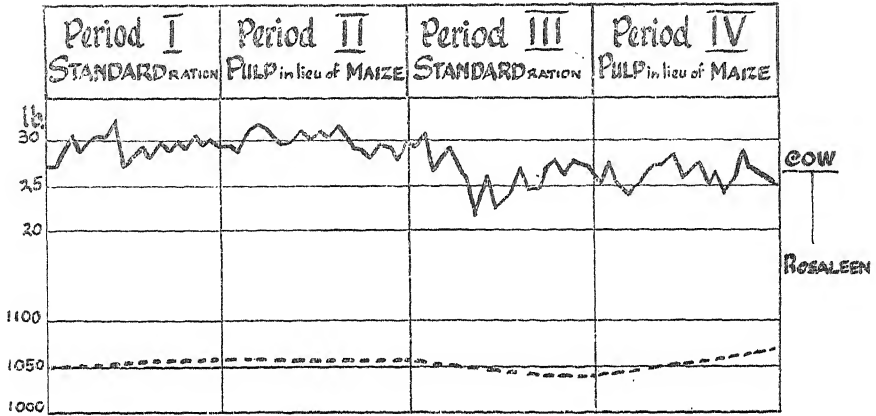
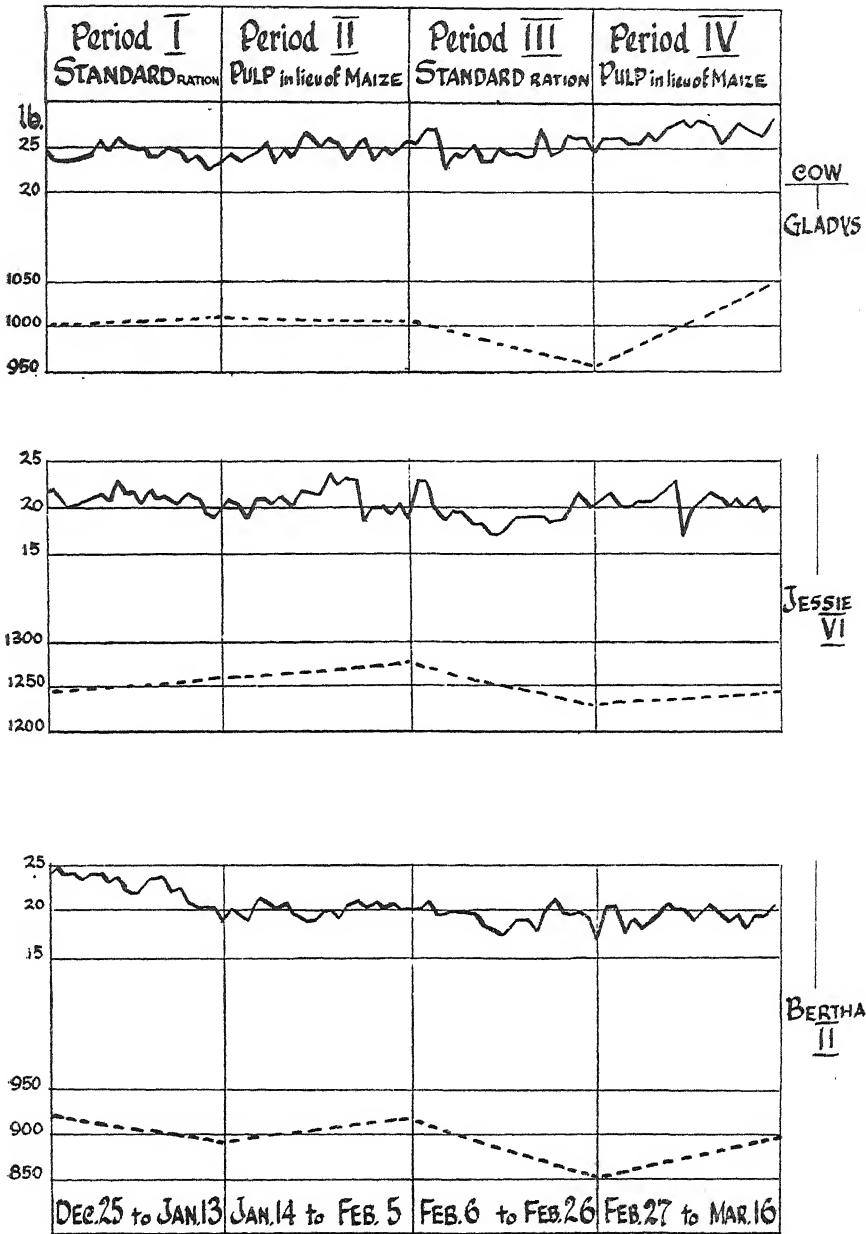


FIG. 8



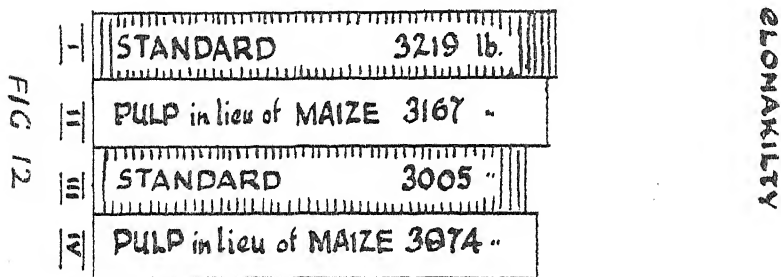
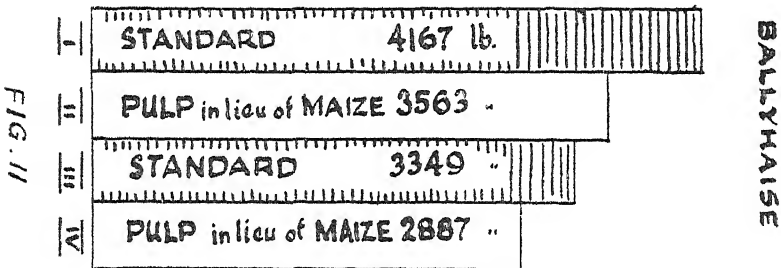
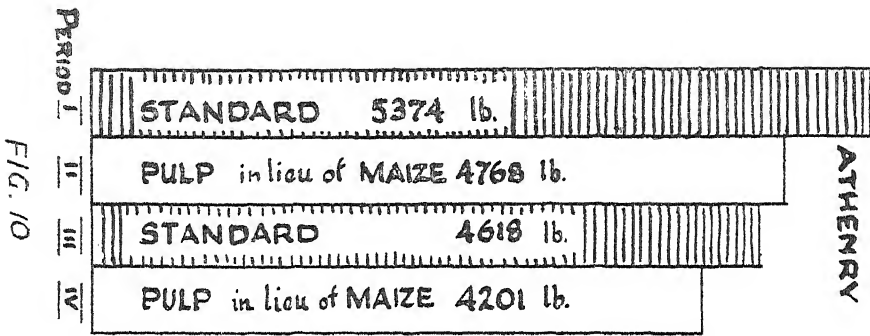
CLONAKILTY 1931-32 — Milk Yield lb.
----- Body Weight lb.

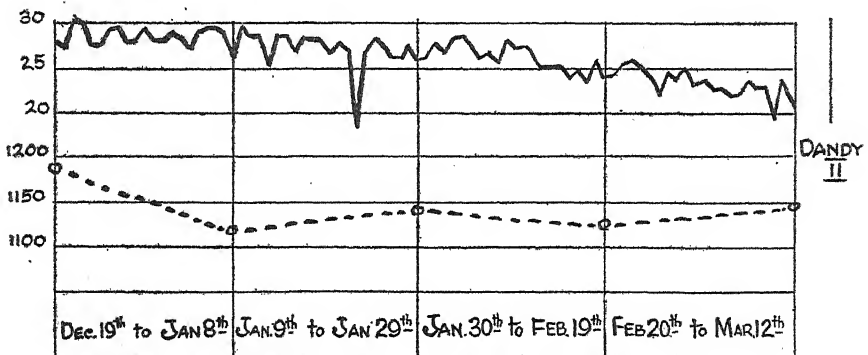
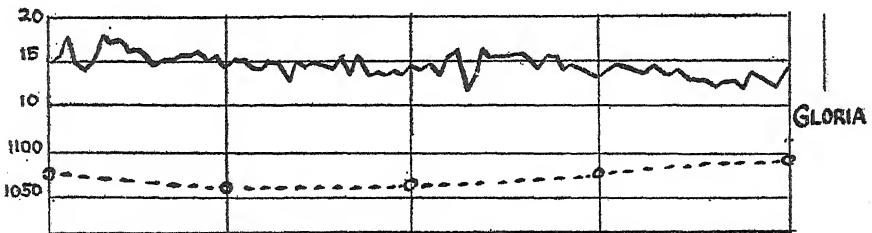
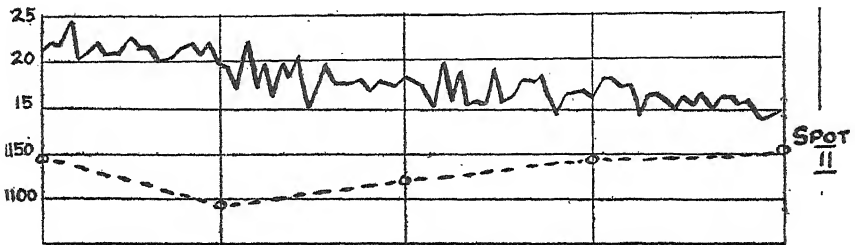
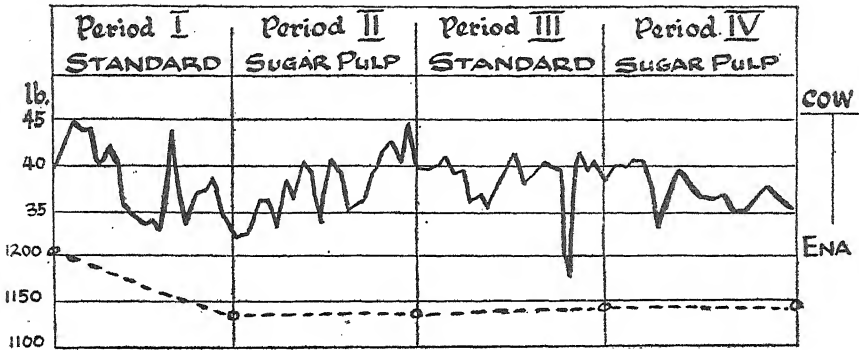


CLONAKILTY 1931-32 — MILK YIELD lb.
 ----- BODY WEIGHT lb.

FIG. 9

DIAGRAM OF MILK YIELD ON DIFFERENT RATIONS 1931-32





ATHENRY 1932-33 — Milk Yield lb.
 ----- Body Wt. lb.

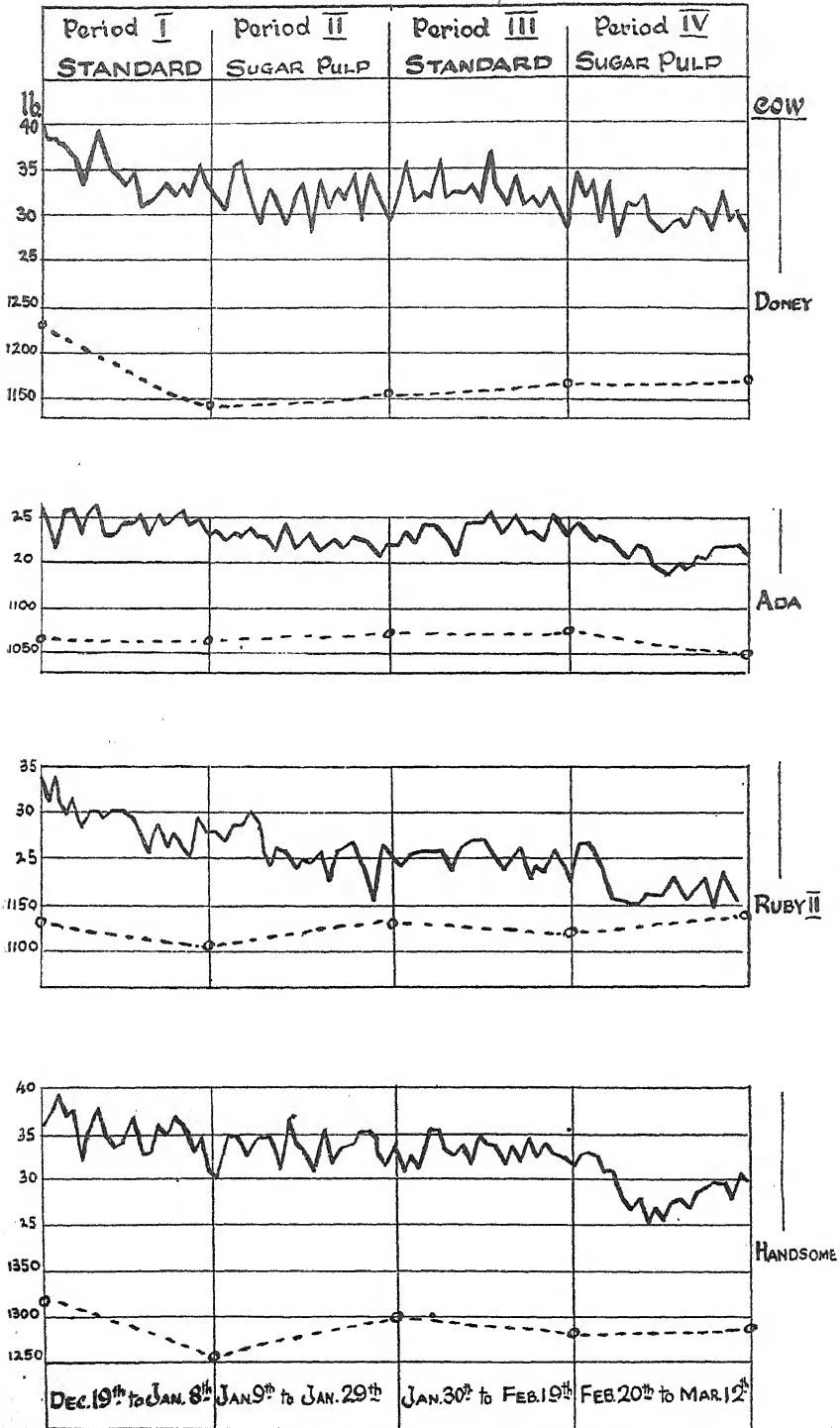
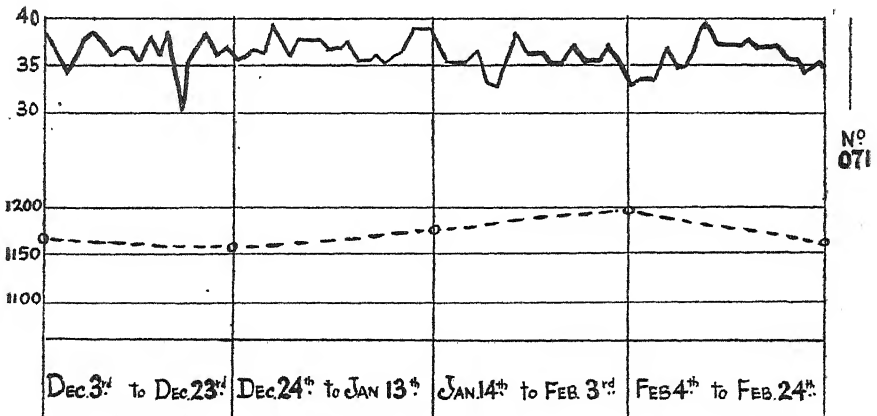
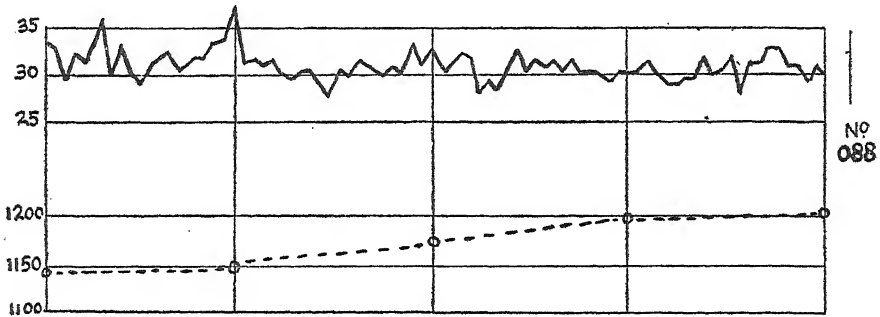
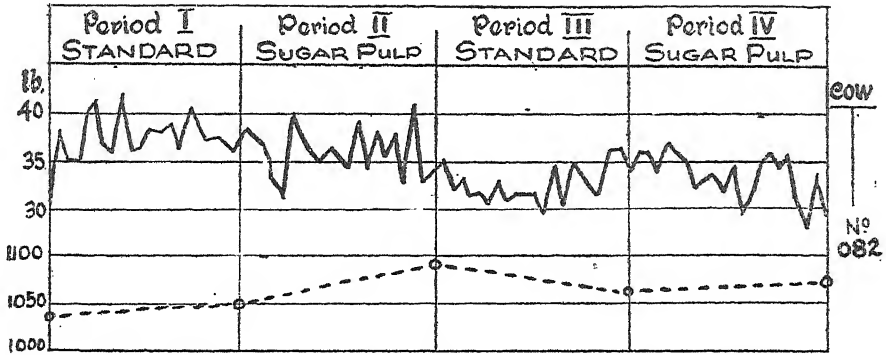
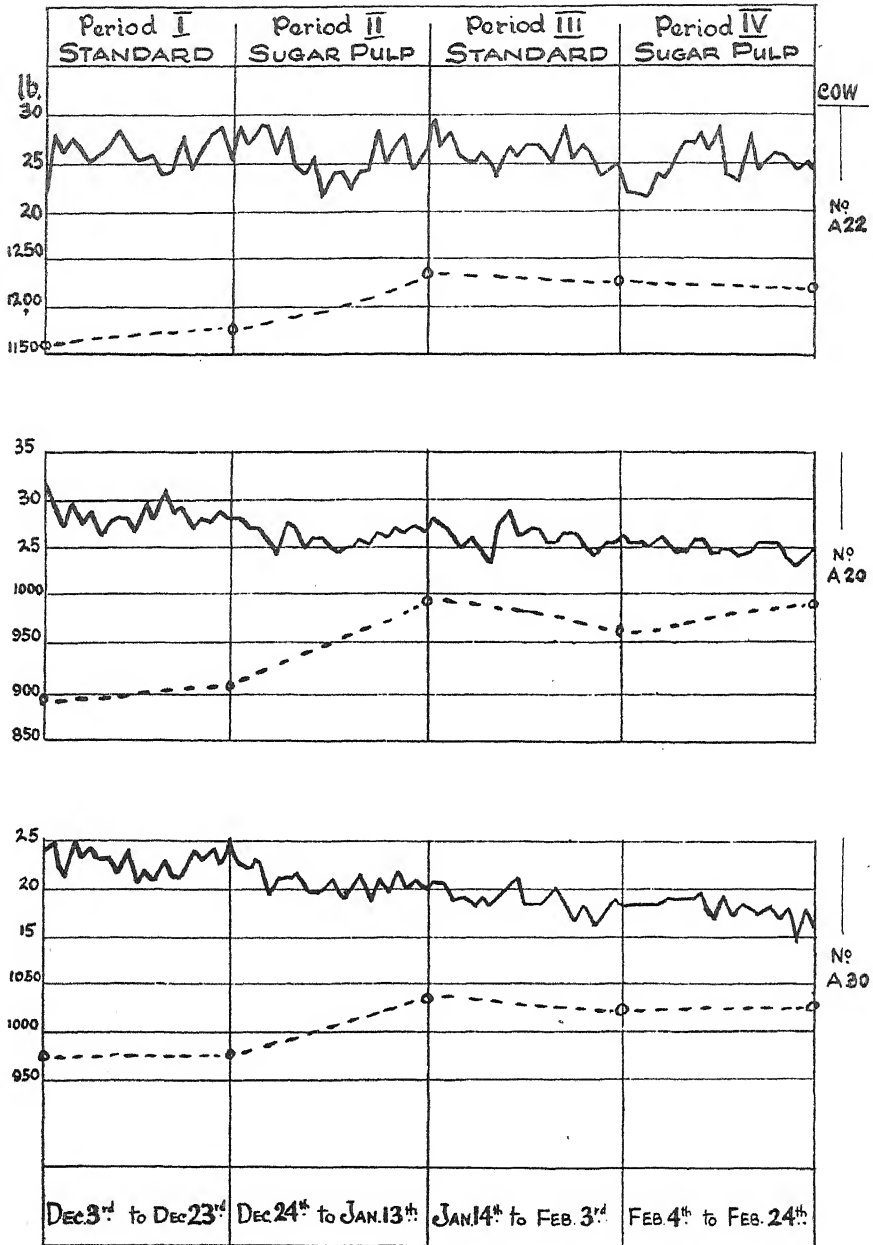


FIG. 13

ATHENRY 1932-33



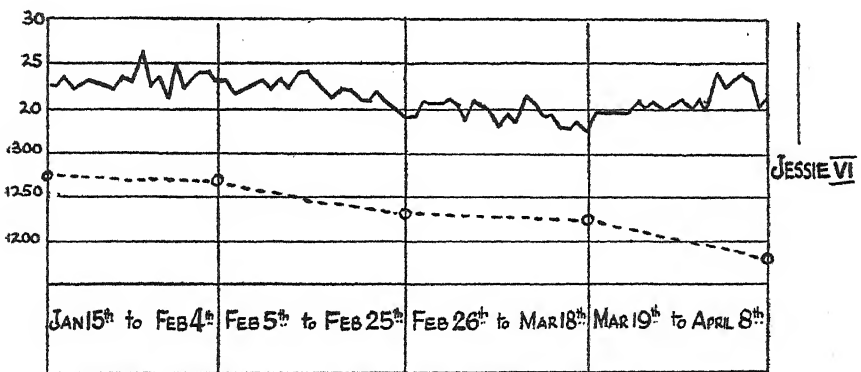
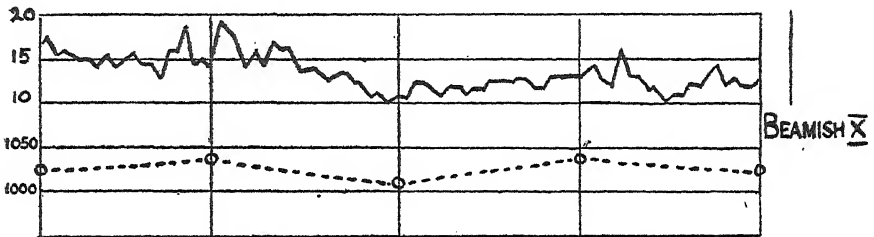
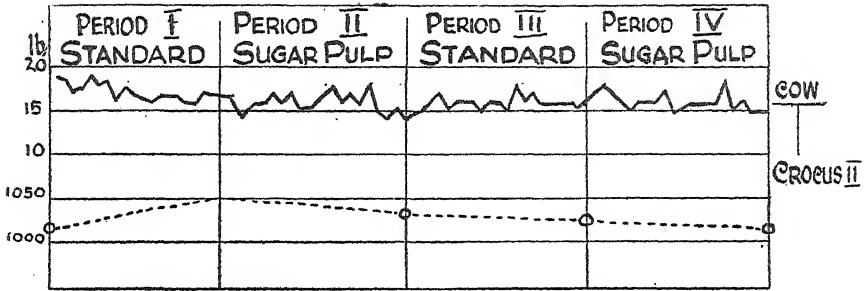
BALLYHAISE 1932-33 — Milk Yield lb.
 ----- Body Wt. lb.



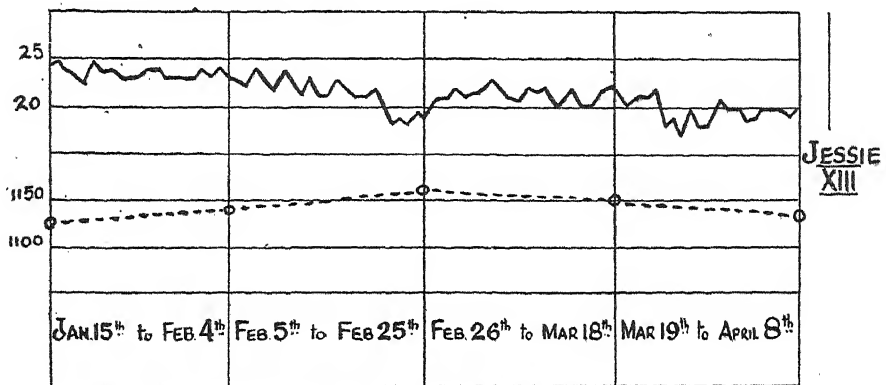
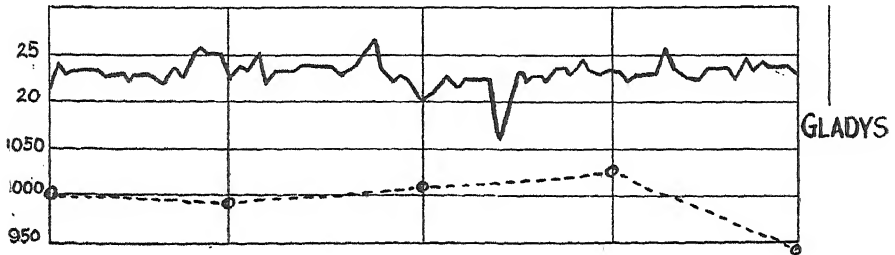
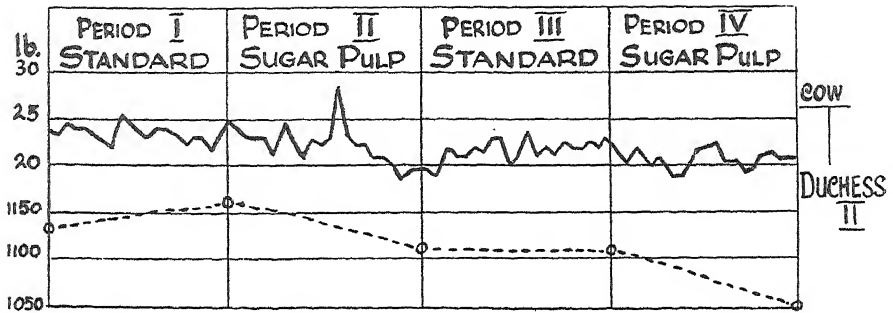
BALLYHAISE 1932-33

— MILK YIELD lb.
 ---- BODY WT. lb.

FIG. 14



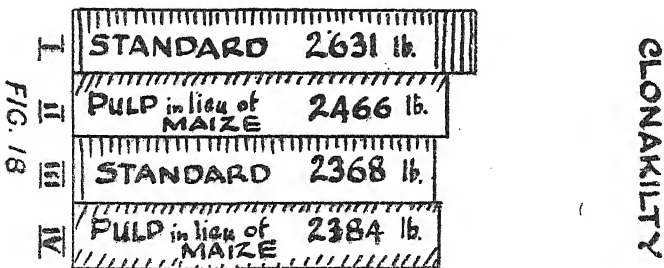
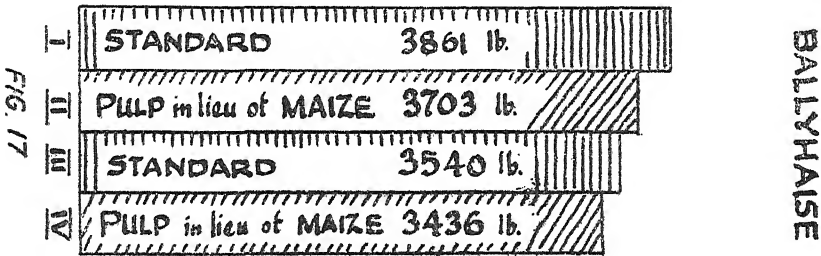
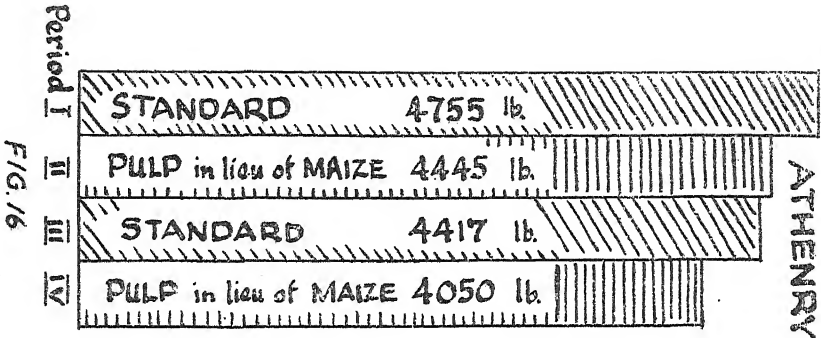
CLONAKILTY 1932-33 — MILK YIELD lb.
 ----- BODY WEIGHT lb.



CLONAKILTY 1932-33 — MILK YIELD lb.
 ----- BODY WEIGHT lb.

FIG. 15

DIAGRAM OF MILK YIELD ON DIFFERENT RATIONS 1932-33



NOTES AND MEMORANDA

The Sugar Beet of the Future.

According to that well-known authority, Dr. H. Claassen, one of the most important and also most controversial questions in connection with sugar beet is: whether is it more profitable to grow beets which produce (a) a high sugar-content, or (b) a heavy yield per acre. It is evident, says Dr. Claassen, that the conditions now prevailing in the industry in different countries cannot be taken into account in solving the problem, since the system of restriction or quota system—voluntary or compulsory—is everywhere in force. Liberty of economic action and competition on the world market has gone, and it is a question whether that liberty will ever return. Should this eventually happen, the country that has done preparatory work in the way of technical and practical research will find itself best equipped.

Some ten years ago, certain German beet-seed specialists put on the market beets which had been specially bred for heavy yield. Outside Germany, the new varieties were decried, and very inadequate cultural trials made it appear as though they were possessed of every imaginable fault, chiefly a low sugar-content and juice of inferior quality. In Germany, on the other hand, opinion as to high-yielding beets changed rapidly when careful experiments, continued through several years, had shown their economic superiority in a large number of cases.

Dr. Claassen at any rate is of opinion that such beets are economically the best from the grower's point of view, particularly when that grower has also a share in the factory, and pockets not only the full return for the sale of the beets but also the value of the leaves and slices as feed for his stock.

The Czecho-Slovakian Sugar Beet Institute have given it as their opinion that the beet of the future will be one containing 20 per cent. of sugar, and yielding a concentrated juice of a purity equal to that of good raw sugar. It will be a high-yielding beet which will be studied and improved with a view to arriving at a constant strain, well defined and resistant to disease, and which, thanks to appropriate cultural methods and a powerful composite manure, will produce a heavy crop of roots while maintaining a sugar percentage not appreciably inferior to that of good beets at the present day.

A.I.V. Silage : Tests at Rothamstead.

During the autumn of 1932, tests were made of this new process, using three crops—green maize, sugar beet tops and kale. Small wooden silos were used for the first two.

Both the maize and beet tops gave well-made silage, but the kale unfortunately was unpalatable. This seemed to be due to the use of too

much acid in making it, viz., 14 gallons per ton of diluted A.I.V. stock solution (chiefly commercial hydrochloric acid diluted with four times its bulk of water). The silage had a markedly bitter taste.

With the beet tops, only 8 gallons of dilute acid were used for each ton of fresh material, and the product was very palatable, being eaten readily by young cattle.

The kale silage was a total failure, except for a layer of small kale near the top of the stack. Twenty-three tons of marrow-stem kale were built into a stack, using the hay elevator, but it was a heavy crop with thick stems and did not settle into a sufficiently compact heap. As a result the bulk of the material continued to ferment and resulted in a rotten, evil-smelling heap. The small kale on top, however, had settled down compactly so that fermentation was prevented, and this product proved palatable. Its analysis was 20 per cent dry matter and 1.45 per cent N.

The following table gives the results of ensiling the maize and the beet tops :—

	MAIZE		BEET TOPS	
	Fresh material	Silage	Fresh material	Silage
Total weight, tons ...	9.19	4.39	10.16	5.90
Dry matter content, per cent. ...	10.28	—	14.45	—
Nitrogen } per cent. in dry	2.02	1.80	2.13	2.18
Fibre } matter.	29.92	40.16	9.77	11.90
Total Ash }	12.39	11.67	20.70	32.91

On the assumption that no loss of fibre occurred in the process, there was a loss of dry matter of 25 per cent. of the maize and of 18 per cent. of the beet tops, and in nitrogen of 30 per cent. for maize and 16 per cent. for beet tops. These losses are of the same order of magnitude as have been obtained for silage prepared in silos in the ordinary way.

A preliminary observational test was carried out on the value of the beet silage to young cattle being outwintered in store condition. Fourteen cattle, receiving 40 lb. silage and 4 lb. concentrates put on 0.92 lb. per day live weight increase, while 13, receiving 10 lb. hay and 3 lb. of the same concentrates, put on 0.96 lb.

Decline of the Poultry Industry in South Africa.

Exports of eggs during the 1933 season down to the week ended November 11 reached the total of 117,833 standard cases of 30 dozen each, in comparison with the total of 131,071 cases for the same period in the preceding year. The total exports for 1933 are therefore not considered likely to exceed 160,000 cases, compared with 172,560 cases in the year before.

The Division of Economics and Markets states that : "The economic factors which have led to this steady decline in the egg export industry

since the peak of 192,601 cases was reached in the 1930-31 season are various and complex. How far the decline may be ascribed to the temporary discouragement of the depression, or to the present definite tendency for the nations of the world to become as far as possible self-sufficient, it is difficult to determine. Certainly, so far as South Africa is concerned, the low prices ruling have caused farmers to reduce their flocks by heavy culling and by restricting the number of pullets raised. The continuance of a relatively high level of prices until late in the past winter is sufficient evidence that breeders have reduced their flocks."

Relative Feeding-Value of Potato Flakes and Slices.

A long report on the results of experiments in feeding potato flakes and slices to cattle and pigs has been published by Professor Fingerling, Leipzig. The experiments with cattle were made as long ago as the winter of 1908-09, under the direction of Professor O. Kellner. The experiments with potato flakes fed to pigs date from the period of the war, while those made with potato slices fed to pigs were completed two years ago. The results obtained are summarised as follows :—

1. When fed to cattle, flakes and slices were equally digestible. Both had a somewhat depressant effect on digestion, but this affected one animal more than another.

2. As regards digestibility, potato slices (fed to pigs) were slightly better than flakes, but the difference lay rather in the natural variation in the value-determining constituents, particularly the nitrogen-free extracts. Seeing that the flakes and slices were derived from raw material of different origins, no particular significance can be attached to the above-mentioned difference.

3. Fed to ruminants, the starch value of the flakes was found to be 83.1 and of slices 87.6 (measured in terms of dry matter). No noteworthy difference between the two was observed.

4. In pig-feeding experiments, a starch-value of 90.1 was found for flakes and of 87.5 for slices, and no noteworthy difference in nutritive value was recorded.

5. Pigs were found to utilise more of the dry matter in flakes and slices than did cattle ; the excess was 33.9 per cent. for flakes and 30.8 per cent. for slices.

6. Calculating the starch value on the basis of the gain in weight produced in cattle and pigs by pure starch flour, no difference was found in regard to starch value for either flakes or slices when fed to cattle and pigs.

The Colorado Beetle in France.

According to the latest report, the Colorado beetle has reached a point less than 40 kilometres (25 miles) from Saint Malo, and is becoming a serious menace to the early potato crop. In view of the state of affairs, a

deputation from the Channel Islands has been conferring with the local agricultural syndicates as to the best means of coping with the plague. The Jersey delegate promised to use his influence with the British Government to bring about an Anglo-French agreement which might serve as a starting-point of a general campaign against the pest and permit of the resumption of commercial relations with Great Britain.

In the course of a paper recently read before the French Academy of Sciences, it was stated that researches have shown that, while the Colorado beetle feeds exclusively upon plants of the genus *Solanum*, its preference for the potato takes only the third or fourth place after certain exotic plants, and one plant which is very common in France, namely, the woody nightshade. It was suggested that this fact might perhaps be turned to practical use in controlling the pest's activities.

Colorado Beetle Menace : Swiss Regulations.

The Swiss Government have issued a description of the Colorado beetle, its appearance and life habits, together with directions for the control measures to be adopted should the pest invade Switzerland. It is pointed out that, though the beetle rarely flies and even then covers but small distances, isolated specimens, and even large numbers, may travel far, carried by the wind or through the agency of the various types of mechanical transport—trains, motors, or ordinary country carts, and may also be conveyed in consignments of potatoes and other vegetables.

The following control measures are recommended :—

1. Regulation of the importation of potatoes and other vegetable produce, particularly with earth attached.
2. Obligation to declare the presence of suspected insects.
3. Systematic picking off of adult insects, larvae and eggs.
4. After picking off insects, centres to be destroyed by burning the plants and disinfecting the soil with tar-oil. For the following four years, trap-plants to be kept and watched. If during this period, no adult insect appears, the centre in question to be considered as extinct.
5. Treatment of the crop by repeated spraying with 1 per cent. solution of arsenate of lead, to which has been added 0.15 per cent. of Paris green and 1 per cent. of grape sugar; the fight against the Colorado beetle may be combined with treatment for ordinary potato diseases (*e.g.*, blight) by adding lead arsenate to the usual Bordeaux Mixture. Some untreated drills should be left as traps.
6. In case of serious attack, sprinkle young plants, before giving the liquid treatment, with Paris green (or lead arsenate or arsenate of lime) mixed with from 10 to 15 parts of slaked lime.

Effect of Feeding-Stuffs on Quality of Eggs.

That the quality of eggs may be influenced by the food consumed by the hen is as natural as that the quality of butter or of bacon can be improved

by a judicious selection of the material fed to cows and pigs respectively. Fowl running at liberty select their food at will, with the result that their eggs have the good flavour which is natural to them. When fowls are kept in captivity, their food must be made to approximate as closely as possible to their natural diet of seeds, worms, grubs, grass and the like.

The Danish National Egg Committee have had their attention directed to eggs with badly coloured, spotty yolks, which are thought to be due to the excessive use of food mixtures primarily intended for cattle, and containing a great deal of cottonseed cake. They accordingly requested the Agricultural Laboratory to investigate the question. This was done, and a report on the matter has been issued.

A flock of 10 Brown Leghorns were isolated in a house which had a grass run attached to it. They were fed with "Lundgaard Mixture" to which was added 65 grammes of corn. When it had been found that the eggs produced on this dietary were of a normal colour, finely-ground cottonseed cake was mixed, first in the proportion of 25 per cent., and then of 50 per cent., with the original ration. When the latter quantity was used, the hens disliked the food, and the eggs diminished in size, and became fewer in number after about a week.

After the birds had been fed for four or five days on food containing the larger proportion of cotton cake, the egg-yolks began to assume a dirty greyish-brown colour, with dark brown veined patches. The membrane enclosing the yolk was thick, shiny and tough. The contents of the yolk were normal in some cases, and in others of a greyish colour and tough consistency. The whites were usually clear, though abnormally gelatinous. In some cases the whites were turbid and brownish, with white or yellow particles. The eggs, when broken, had a disgusting appearance and had to be regarded as useless for human food.

The Egg Committee therefore warn fowl-owners against the use of cattle-feed mixtures containing a large proportion of cotton-cake, as such feeding will spoil the quality of the eggs. They also point out that much harm would be done by the exportation of eggs of the kind described.

Consumption of Margarine in Holland.

As was to be expected, the various measures adopted by the Dutch Government in support of the national dairying industry have had a serious effect upon the manufacture and consumption of margarine. As a result of the compulsory admixture of margarine, 108,000 kegs of butter were used for this purpose in 1932, as compared with 6,700 kegs in the preceding year.

The amount of margarine manufactured in 1932 was 39 per cent. less than in 1931, and the consumption of margarine fell by about 24 per cent. The consumption of butter, on the other hand, increased by about 20 per cent., but this figure includes the butter used for mixing with margarine. The total consumption of butter and margarine in Holland was 3 per cent. less than in the year 1931.

In 1932, the consumption of margarine was 974,400 cwt., as against 1,277,600 cwt. in 1931, whilst butter consumption rose from 1,151,600 cwt. to 1,387,800 cwt. in 1932.

Destruction of Weeds in Cereal Crops by means of Sulphuric Acid Spraying.

Tests of sulphuric acid spraying, as a means of destroying weeds, particularly charlock, in cereal crops, were carried out in 1932 at Shillingford, Oxford, and Linkenholt, Hampshire, by the Institute for Research in Agricultural Engineering of the University of Oxford. The actual spraying was done with a Kartof machine drawn by a tractor. The sulphuric acid used was arsenical B.O.V. (containing 77 per cent acid) in 10-gallon carboys. About 100 gallons of dilute acid per acre was enough to eradicate fairly severe charlock infestations.

At Shillingford the crop (barley) and the weeds were both very thick. After spraying, the charlock wilted rapidly, and was to a large extent eradicated. Where the full 100 gallons per acre was applied, charlock eradication was practically complete. Thistles and docks were temporarily checked. The barley too was checked and after 24 hours was wilted, but gradually recovered, and in 18 to 20 days after spraying was much greener and stronger than the unsprayed portions.

Maturity was delayed on an average by eight days, and it was estimated that in the sprayed portion the yield was increased by about 20 per cent.

At Linkenholt, the crops treated—barley, wheat and oats were thin before spraying. After spraying, the charlock wilted rapidly, but in the portion sprayed with 80 gallons to the acre, eradication was incomplete. Thistles were checked and recovered in a stunted form only. All the cereals were checked and wilted but recovered gradually, and in two to three weeks were noticeably greener and stronger than in places where the spray had missed. Maturity was delayed on an average by 14 days. The estimated increases in grain yield from sprayed portions averaged 5 to 10 per cent. Straw yields were not noticeably affected.

The spraying cost per acre at Shillingford and Linkenholt varied from 10s. to 9s., excluding spraying machine charges. As those trials were the first made with acid, the figures are not regarded as unsatisfactory, though they should be capable of reduction. In both instances the cost of the acid per ton was fairly high, namely £3 7s. 0d. and £4 respectively, delivered by road.

Pig-Recording in Sweden, 1932.

The report on the Government pig-recording or "yield-control" scheme for the year 1932 has now been issued. The number of breeding-stocks tested at the two stations, Astorp and Hallsberg was 61, of which 20 were of the Swedish Farm Breed and 41 Yorkshires. This was the tenth year of work for the Astorp station and the second for the station at Hallsberg.

The following table shows the average results for both stations. It will be noted that these results are almost identical in many cases for the two breeds.

			<i>Swedish</i>	<i>Yorkshire</i>
			<i>Breed.</i>	<i>Breed.</i>
Daily gain per pig and day : grammes	..	..	659	648
Food units per kilo of growth	..	..	3.46	3.50
Loss on slaughter : per cent.	..	..	25.9	25.3
Length of carcase : cm.	..	..	91.5	93.1
Thickness of back fat : cm.	..	..	3.78	3.60
Thickness of belly : cm.	..	..	3.22	3.30
Belly : marks awarded	..	..	12.8	13.1
Hams : marks awarded	..	..	13.1	13.0
Number of pigs in Class I : per cent.	..	..	63	76
Number of pigs in Class II : per cent.	..	..	27	17
Number of pigs in Class III : per cent.	..	..	10	7
Utility value : quality marks	..	..	54.3	56.6
Utility value : quantity marks	..	..	25.0	25.5
Bacon type : slaughter marks	..	..	13.2	13.6

The work at the stations was more extensive in 1932 than in previous years. The number of groups of pigs killed and judged during the year was 205, comprising altogether 777 pigs. Of these animals, 228 (or 29 per cent.) were of the Swedish Farm Breed.

Regulation of Pig-Supplies in U.S.A.

The continuous fall in pig-prices, which began early in 1930, combined with the slight increase (3 per cent.) in pig-production in the Spring of 1933, led the United States Government (acting through the Agricultural Adjustment Administration) to adopt a scheme for relieving the market of a large proportion of the pigs and pig products which would normally have been marketed during the year. To relieve the situation, the Government decided to buy and kill off at least 4 million bonhams and light pigs and 1 million pregnant sows. The greater part of the meat was to be handed over to the Government relief committees on the understanding, however, that the normal buying of meat by these bodies was not thereby reduced.

During the first five weeks (23rd August—29th September, 1933) the number of pigs actually bought by the Government and killed off was 6,196,061. The pigs were distributed to 78 abattoirs for slaughter. The number of sows offered was small. Of the pigs killed, nearly 5 millions, weighed 80 lb. and under, whilst 1 million weighed from 80 to 100 lb. The pigs in this latter group, and also the sows, were turned into pork if approved by the veterinary experts. The pork was salted down and handed over to the Federal Relief Organisation for distribution as required. Bonhams weighing less than 80 lb. were turned into feeding stuffs and fertilisers.

The pigs were bought at a price which was slightly higher than that ruling on the market, and varied from 6 dollars per 100 lb. for pigs weighing from 96 to 100 lb. to $9\frac{1}{2}$ dollars per 100 lb. for pigs weighing from 25 to 30 lb. The highest premium was thus paid for the lightest type of pigs. For pregnant sows, the market price, plus a premium of four dollars per head, is paid.

The whole question of over-production in the pig industry was aggravated by the partial failure of the maize crop and the consequent rise in maize prices owing to the summer drought in 1933. To meet this difficulty, the U.S. Department of Agriculture have devised a scheme for helping farmers who are both pig-breeders and maize-growers. What is known as a "benefit payment" is made to these farmers on condition that they reduce their production of pigs and of maize. The necessary funds for this are raised by the imposition of a "processing tax" on pigs killed, and by a similar tax on maize which is transformed into some commercial product and does not therefore come on the market in the form of pig-meat.

Co-operative Egg Trade in Germany.

In 1932, the 19 German Raiffeisen agricultural egg co-operative centres and their branches handled 458,970,990 eggs, as compared with 507,387,136 in 1931. This is the first fall in numbers registered since the establishment of the co-operative egg centres and it is attributed to various causes.

In 1932 the price level of eggs was exceedingly low. As a result, more eggs were used by the farming classes and many poultry farms which had to purchase their feeding stuffs went bankrupt. Consequently fewer eggs were offered to the co-operative centres.

The enforcing of the Commercial Classification Order of the 17th March, 1932, had a very adverse effect on the co-operative trade. It gave the general egg trade the right of standardisation on very easy terms and permission to use the Eagle stamp, which had hitherto been reserved for the co-operative societies. The Maize Order under which the general trade were empowered to issue vouchers for cheap maize to their suppliers took from the co-operative societies their last privilege and caused many wavering suppliers to drop off.

The financial position of most of the co-operative centres is, on the whole, satisfactory. The year 1932 was probably the most difficult in the history of the co-operative egg trade, but the measures taken by the new Government to place the egg industry on a sound basis and to ensure that German eggs may be able to compete successfully against the dumping measures of 30 European and overseas countries, give grounds for hope that the German poultry industry has passed the crisis.

Abattoir Loan Fund in Sweden.

The Swedish Government have issued a statement to the effect that loans from this fund will be granted to any economic organisation having for its object the carrying-on of a co-operative abattoir, the majority of the members

of which are farmers. The loan may be obtained for the purpose of establishing, equipping or purchasing an abattoir, its fittings and material, for rebuilding an abattoir, or for the installation of improved equipment. The organisation in question must be suitable for the purpose intended as regards its economic status, working methods, and general circumstances, and it must be an affiliated member of the national federation of Swedish abattoirs.

The members of the abattoir are bound to supply pigs, and must not resign their membership before the lapse of at least five years. The largest sum which can be obtained by loan is five-sevenths of the total cost as calculated by the Department of Agriculture in each particular case. Interest at the rate of $4\frac{1}{2}$ per cent. annually is payable on the loan, starting from the day on which the loan was raised. Amortisation begins in the third year, and equal annual payments are made for a period to be fixed by the Department of Agriculture. The amortisation period for loans in aid of technical improvements may not exceed ten years and for other loans, twenty years.

Danish Agricultural Crisis.

The suggestions as to the distribution of surplus butter to hospitals, etc., attributed to the Danish Minister for Agriculture in June last, have apparently not been put into practice.

On the contrary, several recent references seem to indicate that the whole question of how the agricultural crisis in Denmark may best be met still remains undecided. The scheme for the rationing of pig-supplies is, indeed, in operation, but it is the subject of much criticism and discontent.

A recent report by the Canadian Trade Commissioner for Scandinavia contains the following passage:—"During the summer an agricultural commission, including within its membership representatives of all the important political parties, has been investigating the position of the farming community. Based on conclusions reached by this commission, several bills were drafted and presented to the Rigsdag on September 19th. These bills dealing with the agricultural crisis will shortly be debated, and in the meantime valuta permits for grain are being issued for only one month at a time. Generally permits are issued for four-month periods.

"Opinion differs as to the measure of relief which the Rigsdag will recommend to be extended to the farmers with respect to grain, butter, hogs, and cattle control, and with respect to reduction of interest rates on farm mortgages, but it is certain that something will be done, and the grain trade may be affected if some machinery could be devised which would permit the Danish grain growers to receive higher prices and the price of bread remain unchanged.... In the meantime, until definite action is taken concerning this crisis legislation, and considering that valuta permits for grain are only issued for a month at a time, the situation is peculiar."

In a paper on agricultural policy, read at the annual meeting of the Zealand Agricultural Associations which was held on 17th and 18th

November, Dr. Jorgen Pedersen pressed for the introduction of a measure which would enable a tax to be levied on all butter intended for home consumption such that the wholesale price of butter on the Danish home market would be brought up to 250 Ore per kilo (about 1/- per lb.), and he further advocated a tax on milk consumed in liquid form. He also proposed a tax on margarine in order to prevent a fall in the consumption of butter.

Colorado Beetle in British Columbia.

According to the Annual Report of the Department of Agriculture for the year 1932, their Horticultural Branch has been carrying out certain control measures against the Colorado beetle which is found only in the East Kootenays. The report states that, while it has been found impossible to eradicate this pest, the fact that it has not spread to other areas would seem to justify the expenditure which has been made. The report furnished by the Branch in charge of the work states that there was a marked lessening in the area in which the pest was found, as compared with the previous year. The work is being continued for another year.

Export Bounties in Finland.

Finland's Finance Bill for 1933-34 provides for the introduction of a new scheme of export bounties to replace the one now in force. The new year will see the expiry of the law under which export bounties are granted on eggs and bacon, and of the law which provides bounties for stabilizing the price of certain dairy products. The Government, it seems, are not agreed as to the form which the bounty scheme is to take, although the Finance Bill now under discussion envisages the continuation of the policy of bounties. It is presumed that the export bounty on butter will be raised to 5 Finnish Marks per kilo (2.6 pence per lb.) when the wholesale price for export butter is 22 F.Mk. or under (10.6 pence per lb.). When the butter price rises, the export bounty will be correspondingly reduced, and will entirely vanish when the price reaches 13 pence per lb. or upwards. The export bounties on cheese, pork and eggs are also to be reduced and are expected to be approximately as follows :—

Cheese	..	..	..	..	0.9 pence per lb.
Pork, smoked or salted	..	..	..	..	1.17 „ „
Pork, fresh	..	..	..	..	0.9 „ „
Eggs	..	..	..	..	1.12 „ „

The total sums required for these bounties during the coming year are estimated at £420,354 for butter, £20,354 for cheese, £32,666 for pork, and £132,743 for eggs.

Department's Exhibit at Royal Horticultural Society Show.

A Potato Exhibit was staged by the Department of Agriculture at the recent Autumn Show of the Royal Horticultural Society held at the Crystal Palace, London. The Department were awarded a Knightian Medal for the Exhibit.

The Exhibit, which created very keen interest, consisted of a collection of seventy-two dishes illustrating the history of potato varieties for the past two hundred years. Particulars regarding these varieties are given in the article on the History of Potato Varieties in this Journal.

Some of the varieties have been in cultivation in this country for 150 years. Amongst the oldest are Pink Eyes, grown fairly extensively until very recently in the Arran Islands, and Irish White from Co. Donegal.

EXPERIMENTS ON GRASS SILAGE

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PART I.—A.I.V. SILAGE.

In view of the increased attention given to the conservation of grass and other fodders by what is known as the A.I.V. method and the claims advanced in its favour, a preliminary experiment was carried out on the making of grass silage by this method at the University College Farm, Bishopstown, Cork, in 1932-33.

The process consists of the application of a solution composed of mineral acids to the material to be ensiled so as to raise the hydrogen ion concentration as quickly as possible to a value between pH.2 and pH.4, with the object of checking respiration and bacterial fermentation.

The container used was of the circular wooden "tub" type used in Finland, where this particular method of fodder preservation originated. The "tub" was 10 feet in diameter, 6 feet high and had a superstructure 6 feet in height. One half of the "tub" was below ground level and the portion above ground level was earthed up on the outside so as to exclude air. Provision was made for drainage by means of a pipe leading from the centre of the floor to a manhole on the outside.

The material used was aftermath taken from a two-acre field of second quality which had been in grass for many years. A dressing of liquid manure was applied after the first cut had been removed. Cutting took place on 19th September, by which time the grass was about 6 to 8 inches high. The grass was cut and collected with the ordinary machinery without difficulty and filled into the silo on the same day. In filling the silo about 2 cwts. of grass were added at a time and the requisite amount of diluted A.I.V. solution carefully sprayed from an acid-resisting sprinkling can. The rate of application was 13 gallons per ton of grass. Every precaution was taken to pack the grass well so as to exclude air. When the basal portion was filled the superstructure was placed in position and filling continued. When this was completed the top layer was treated with a double quantity of A.I.V. solution to which was added a special anti-mould preparation. A layer of cabbage leaves was spread on top and over this a layer of earth to a depth of about one foot. After 15 days the mass had settled down into the basal portion of the silo and the superstructure was removed. The drain, which was closed during the filling, was opened after about a week.

Yield.—The total quantity of aftermath taken from the two-acre field and filled into the silo was 6 tons 6 cwts. 3 qrs.

Losses.—For the purpose of estimating losses, samples of the grass were taken throughout the filling. Two composite samples were taken from these, one representing the grass filled into the bottom portion of the silo

and the other, the top portion. These were analysed and the average taken as representing the composition of the grass at the time of filling. The silo was opened in January, During the time the silage was being fed numerous samples were taken from different levels of the silo and analysed, and thus an average composition of the silage was obtained. The average composition of the grass and resulting silage is shown in Table I.

TABLE I.
AVERAGE COMPOSITION OF GRASS AND SILAGE.

				<i>Grass.</i>	<i>Silage.</i>
Moisture	..	..	..	80.52%	79.90%
Protein	..	..	..	2.96%	3.08%
Oil	..	..	..	0.35%	0.64%
Fibre	..	..	..	4.96%	5.45%
Ash	..	..	..	1.70%	1.64%
Carbohydrate	..	..	..	9.51%	9.29%

As all the grass was weighed when the silo was being filled and all the silage was weighed coming out, it is possible to determine the loss in dry matter on the whole mass. This is shown in Table II.

TABLE II.
LOSS IN DRY MATTER.

Weight of grass ensiled	..	..	126.75 cwts.
Percentage dry matter in grass	..	..	19.48 „
Weight of dry matter ensiled	..	..	24.7 „
Weight of Silage	..	..	114.0 „
Percentage dry matter in Silage	..	..	20.1 „
Weight of dry matter recovered in Silage	..	..	22.9 „
Loss in dry matter	..	..	7.3%

The quantity of effluent which escaped from the silo was 600 lb. This had an average dry matter content of 5.2 per cent. and a protein content of 1.6 per cent. The total loss in dry matter through drainage was therefore 31 lb. This amounts to a loss of approximately one per cent. of total dry matter put into the silo.

In a previous communication (1) the authors have shown that the loss in dry matter in the case of ordinary silage was 15.6 per cent. while Drew and his co-workers (2) report losses of 13.1 per cent. and 17.7 per cent. in dry matter in making ordinary silage.

The loss in dry matter resulting from the A.I.V. method of grass preservation is therefore considerably less than that obtained when the ordinary method is adopted. It should be noted that the weight of dry

matter recovered in silage includes some inedible material. The total quantity of inedible material was 10 cwt., which brings total losses in dry matter up to $15\frac{1}{2}$ per cent. The relatively small silo used is responsible for this comparatively high figure—the loss due to wastage being relative and dependent mainly on the size of the silo.

Quality of Fodder.—The silage was light brown in colour and, with the exception of the top layer, had an agreeable odour. The top layer contained several evil smelling “pockets” which showed evidence of much protein decomposition. These apparently escaped acid treatment. Butyric fermentation seemed to be absent. The pH. of the fodder showed a marked gradient, the top portion giving values of pH. 4.2 and pH. 4.0 while the lower portion gave values of pH. 3.8 and pH. 3.7.

Replacement Values.—Several preliminary analyses of hay, roots and silage were made. From the results of these, starch and protein equivalents were calculated with the aid of figures derived from tables given in “Rations for Live Stock” (3). Values obtained in this way can only be approximate. They serve, however, as a basis for arriving at replacement values for silage and foods for which it may be used as substitute. It is claimed for the A.I.V. process that the composition and digestibility of the resultant silage are the same as that of the grass from which it was made. Working on this assumption the starch and protein equivalents for silage were calculated. These, together with the corresponding values for hay and roots, were as follows :—

					<i>Starch Equivalent</i>	<i>Protein Equivalent</i>
Silage	..	..	..	..	11.3	1.7
Hay	..	..	..	..	35.0	3.4
Roots	..	..	..	..	5.3	0.3

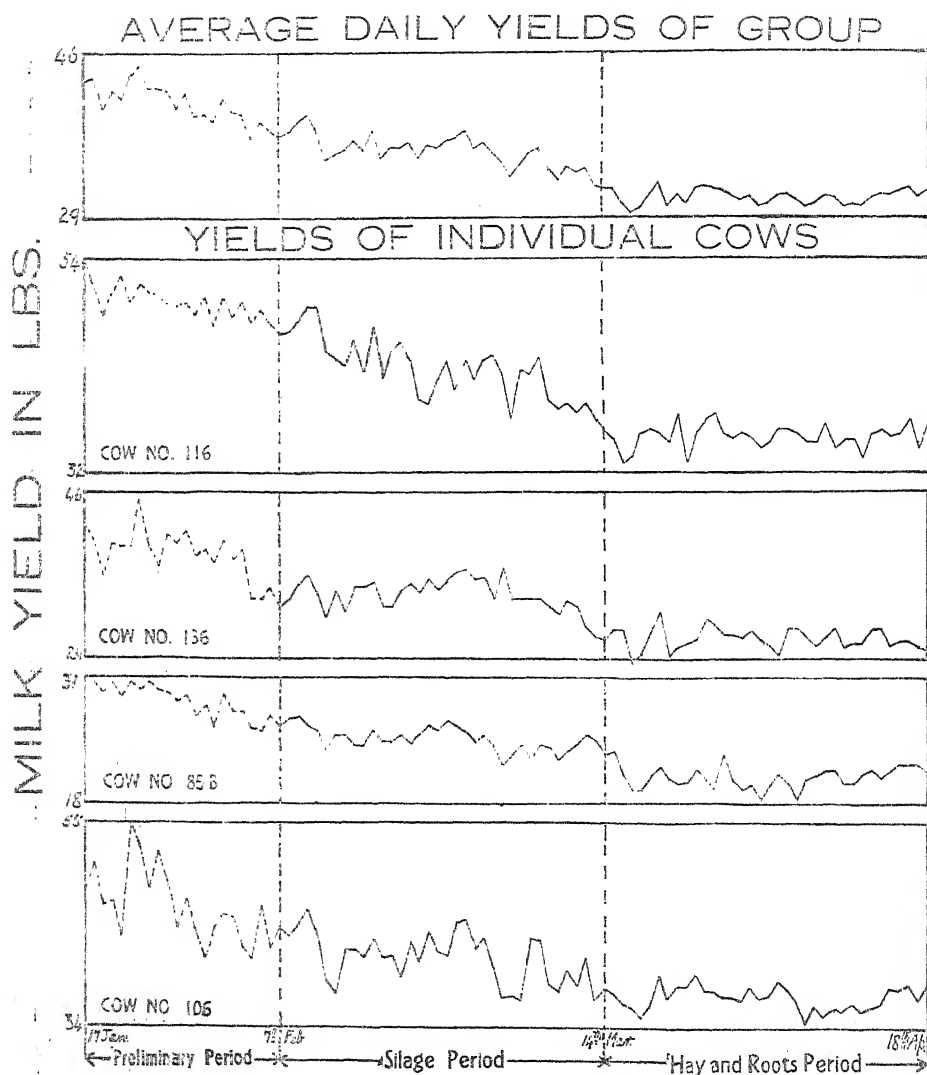
On the basis of these equivalents the following approximate replacement values were adopted.

3 lb. silage	=	1 lb. hay.
1 lb. „	=	2 lb. roots.

FEEDING EXPERIMENTS.

Dairy cows.—Ten dairy cows were selected as suitable for a feeding trial and, for a preliminary period, portion of the hay and roots fed was gradually replaced by increasing quantities of silage on the basis of the replacement values already given. Most of the animals however, were reluctant to eat the silage and could not be used for a feeding trial.* Only four cows showed a relish for silage and even these consumed only sufficient to replace portion of the hay and roots ordinarily fed. The plan of feeding adopted for these four cows, showing rations together with the starch and protein contents of the basal foods, is shown in Table III.

* In the current year's experiments with A.I.V. Silage, dairy cows are fairly readily consuming up to 56 lb. per head daily.



Graphical representation of yields when portion of Hay and Roots is replaced by A.I.V. Silage

TABLE III.

STARCH AND PROTEIN CONTENTS OF BASAL FOODS.

		1st Period (5 weeks)			2nd Period (5 weeks)		
		RATION lb.	S.E. lb.	P.E. lb.	RATION lb.	S.E. lb.	P.E. lb.
A.I.V. Silage	..	35	3.9	0.60	—	—	—
Hay	..	7	2.45	0.24	14	4.90	0.47
Roots	..	28	1.48	0.09	56	2.96	0.17
Dec. Ground Nut Cake		1	0.73	0.41	1½	1.10	0.61
TOTAL	..		8.56	1.34		8.93	1.25

The above rations were fed for maintenance and 1 gallon of milk. Four pounds of a balanced concentrate mixture were fed for each subsequent gallon. The concentrate mixture used was as follows :—

- 4 parts maize meal.
- 2 „ crushed oats.
- 1 „ bran.
- 2 „ malt culms.
- 2 „ dec. earth nut cake.

Any silage left uneaten was weighed and recorded. During the silage period the four cows consumed approximately 80 per cent. of the silage fed. The average daily milk yield of the four cows for each week was as follows :—

TABLE IV.

AVERAGE DAILY MILK YIELD IN LB.

1ST PERIOD (Silage)					2ND PERIOD (Hay and Roots)				
1st week	2nd week	3rd week	4th week	5th week	6th week	7th week	8th week	9th week	10th week
37½	36½	36¼	35¼	34	31	31½	31	30½	31¼

The individual daily yields and the daily group average are shown in graphical form opposite.

During the period when A.I.V. silage partly replaced hay and roots, the average daily yield of the four cows dropped from 37½ lb. for the first week to 34 lb. for the fifth week. This may be regarded as normal variation in the yields of cows calved from four to ten weeks. After the change-over to all hay and roots, the average daily yields dropped, but for the succeeding four weeks were very well maintained at the lower level.

The cows were weighed on three successive days at the beginning, at the change-over, and again at the end of the trial. The net result at the end of the silage period was a decrease in total weight of 7 lb.—two of the cows showed a slight increase and two a slight decrease. At the end of the second period all four cows showed a decrease in weight, which was, however, within the limits of experimental error.

Result.—Owing to the limited scope of the feeding trial, definite conclusions cannot be drawn. Considering the trend of the milk yield curves and the cows' weights, it would appear that the replacement values adopted somewhat undervalued the silage in view of the fact that the cows consumed only 80 per cent. of their allowance.

Calves.—A group of ten yearling calves was also utilised for a feeding trial. These were divided into two lots of five each as similar as possible in every respect, and fed for seven weeks as follows :—

Lot 1 .. 7 lb. hay.
 .. 28 „ roots.
 .. 3 „ meals

Lot 2 .. 35 lb. A.I.V. silage.
 .. 3 „ meals

The meals consisted of equal parts of linseed cake and crushed oats. The calves were weighed on three successive days at the beginning and end of this period. Both lots appeared in good condition and were indistinguishable from each other at the end of the trial.

The results are given in Table V.

TABLE V.
 AVERAGE LIVE WEIGHT INCREASES.

	Average initial l.w.			Average final l.w.			Average l.w. increase	Period of Experiment	Average daily l.w. increase
	cwts.	qrs.	lb.	cwts.	qrs.	lb.	qrs. lb.		lb.
LOT I. (Hay and Roots)	5	0	19.6	5	3	9.8	2 18.2	49 days	1.51
LOT II. (Silage)	..	4	3 14	5	2	5.2	2 19.2	49 days	1.53

Result.—A.I.V. silage may safely be fed to yearling calves and for this purpose 35 lb. silage adequately replaces 7 lb. hay and 28 lb. roots.

PART II.—ORDINARY GRASS SILAGE.

In a previous communication (1) details were given of an experiment on the making of grass silage in a concrete pit by the ordinary method. Further experiments on ordinary grass silage were carried out in 1932 and 1933.

Yields.—In 1932 the grass for silage was obtained from a field which had been used for this purpose the previous year. A dressing of artificial manure consisting of 1 cwt. sulphate of ammonia, 3 cwt. superphosphate and 1 cwt. kainit was applied early in February at the rate of 5 cwt. per acre. Two cuttings were made. The first took place towards the end of May, by which time the earlier grasses had already reached the flowering stage. After the removal of the first cut a dressing of 1 cwt. nitro chalk per acre was applied and a second cut taken in September.

YIELDS OF GRASS PER ACRE.

				<i>Tons Cwts.</i>	
1st Cut	..	..	..	6	10 $\frac{1}{4}$
2nd Cut	..	..	..	4	12 $\frac{1}{2}$
Total Yield	..	..	..	11	23 $\frac{3}{4}$

The total amount of grass ensiled was approximately 56 tons. The average dry matter content of the two cuttings was 23.9 per cent.

In 1933 the same field was utilised and in February got a similar dressing of artificial manures to that which was applied in 1932. Owing to the very dry summer only one cutting was available for Silage. This was taken during the first week in June. The yield of grass obtained was 4 tons 13 cwts. per acre and the average dry matter content was 22.8 per cent.

For the purpose of estimating losses in dry matter during ensiling, bags of grass were embedded at various points in the general mass as described for the previous experiment (1). The average composition of the grass and silage for both years is shown in Table VI.

TABLE VI.

COMPOSITION OF GRASS AND SILAGE, 1932 AND 1933.

			1932		1933	
			<i>Grass</i>	<i>Silage</i>	<i>Grass</i>	<i>Silage</i>
Moisture	..	..	76.10	74.96	77.18	78.89
Protein	..	..	2.82	2.93	2.84	2.70
Fibre	..	..	6.76	7.53	7.30	7.31
Ash	..	..	1.83	1.98	1.65	1.63
Oil	..	..	.39	.65	.41	.61
Carbohydrates	..	..	12.10	11.95	10.62	8.86

The losses in dry matter in the bags placed at various points in the silo are shown in Table VII.

TABLE VII.

LOSSES IN DRY MATTER.

	1932		1933	
	<i>Grass</i>	<i>Silage</i>	<i>Grass</i>	<i>Silage</i>
Weight of material in bags ..	195 lb.	164 lb.	124.75	120.5
„ dry matter in bags	46.6 lb.	41.06 lb.	28.47	25.44
Per cent. loss ..	11.9		10.6	

The above losses are due to fermentation and respiration. In both cases they are much lower than that obtained in the previous experiment (1) *viz.* 15.6. In the earlier experiment, the grass had reached the hay stage at time of ensiling and close packing was impossible, resulting in increased fermentation. To the above percentage losses in dry matter, *viz.* 11.9 and 10.6, must be added the losses due to inedible material. It is estimated that in 1932 1½ tons, and in 1933, 1 ton 2 cwt. were unfit for feeding. This brings the losses in dry matter up to 14.7 and 15.4 per cent. respectively.

Feeding Trials.—The silage made in both years was of good quality and was readily eaten by stock. The 1933 silage crop was used to replace all the hay and roots in the maintenance part of the ration of dairy cows during the spring of 1934. Eight cross-bred Shorthorn cows were selected as suitable for a feeding trial and were divided into two groups of four cows each, the groups being as similar as possible in every respect. For each group in turn, silage was used to replace all the hay and roots in the maintenance portion of the ration. It was not possible to arrange to have all the cows in a particular group of the same approximate live weight. This initial difference in live weight was taken into account when calculating the maintenance requirements of the animals. The cows were fed individually such quantities of silage or of hay and roots as were calculated to supply the nutrients required for maintenance. The plan of the experiment was as follows :—

1st Period (5 weeks).	2nd Period (5 weeks).
Group I. Hay and Roots.	Silage.
Group II. Silage.	Hay and Roots.

The approximate amounts of starch and protein supplied in the quantities of silage and of hay and roots fed to a cow of average weight are shown in Table VIII.

TABLE VIII.

STARCH AND PROTEIN CONTENTS OF BASAL FOODS.

		RATION	S.E.	P.E.	RATION	S.E.	P.E.
		lb.	lb.	lb.	lb.	lb.	lb.
Silage	..	—	—	—	62	0.7	0.68
Hay	..	16	5.1	0.56	—	—	—
Roots	..	42	1.9	0.11	—	—	—
Totals	..	—	7.0	0.67	—	6.7	0.68

As already stated, the silage was of good quality. The hay fed had a higher fibre content than that previously used and was therefore given a starch equivalent value of 32. All cows were fed the following concentrate mixture at the rate of 4 lb. per gallon of milk produced :—

3 parts crushed wheat.
 3 „ maize meal.
 3 „ bran.
 1 „ dec. ground nut cake.
 1 „ dec. cotton seed meal.

The individual daily milk yields and the daily group averages are shown in graphical form opposite p. 159

The average daily milk yields for each week are shown for both groups in the following Table.

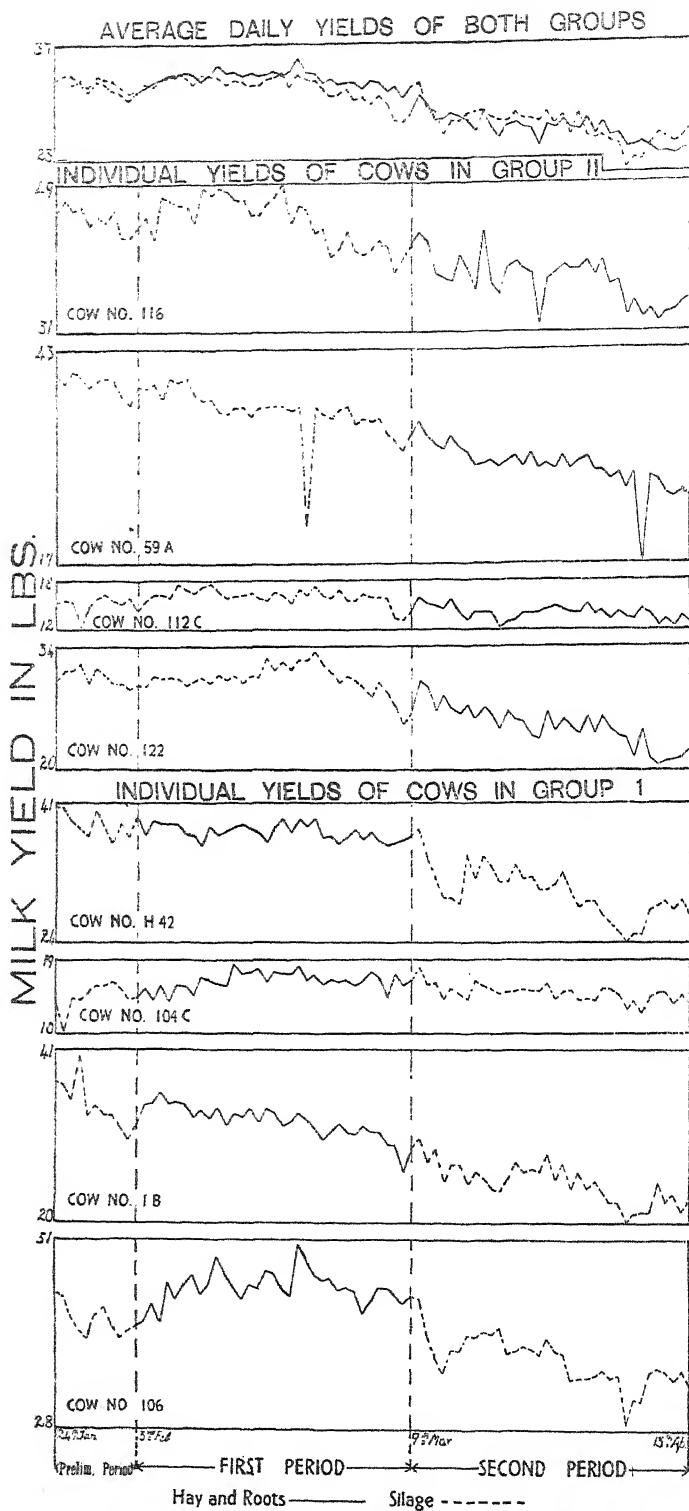
TABLE IX.

MILK YIELDS.

WEEK	1ST PERIOD					2ND PERIOD				
	1	2	3	4	5	6	7	8	9	10
Group I. Average daily milk yield (lb.) ..	32½	33½	33½	33	31½	28½	23	27½	24½	24½
Group II. Average daily milk yield (lb.) ..	32½	32½	32½	31½	29	28½	26½	26½	25½	23½

The milk yields as shown in the Graph and also in Table IX show normal variation during both periods.

Omitting the first week of the trial and the first week after the change-over, the yield of milk obtained during eight weeks when hay and roots were used for maintenance was 6482 lb. The corresponding figure when



Graphical representation of cows' yields when Untreated Grass Silage replaces
all Hay and Roots

silage replaced hay and roots for maintenance was 6430 lb.—a difference of less than 1 per cent. which is negligible.

The cows were weighed on two consecutive days before the commencement of the trial, at the change-over and at the conclusion. The changes in the weights of the animals were of a small order and do not appear to have been affected by the method of feeding adopted.

Result.—On the basis of the starch and protein equivalents adopted, ordinary silage can be used to replace all the hay and roots in the ration of dairy cows.

SUMMARY.

An experiment on the making of grass silage by the A.I.V. method in a wooden silo of the Finnish type showed that the loss in dry matter due to respiration and fermentation was 7.3 per cent.

The silage was used to replace portion of the hay, roots and concentrates in the ration of dairy cows in the proportion of 35 lb. silage to 7 lb. hay, 28 lb. roots and $\frac{1}{2}$ lb. ground nut cake. The results seem to indicate that in these proportions the feeding value of A.I.V. silage is somewhat underestimated.

In a feeding trial with yearling calves, A.I.V. silage adequately replaced hay and roots in the above proportions.

Experiments on the making of ordinary silage on a large scale in a concrete pit are described. Losses in dry matter due to respiration and fermentation in two successive years were 11.9 per cent. and 10.6 per cent. respectively.

In a feeding trial with dairy cows, 62 lb. ordinary silage adequately replaced 16 lb. hay and 42 lb. roots for maintenance purposes.

At present there are three promising methods of conserving summer grass as ensilage, *viz.* the ordinary method, the A.I.V. method and by the addition of molasses. The A.I.V. method has the advantage that it reduces losses in dry matter due to respiration and fermentation to a very small amount. It is less adaptable, however, to normal farm routine than the ordinary method. When young grass is used for silage by the ordinary method and is well packed in fairly dry condition, the losses due to respiration and fermentation are not excessive. The loss due to wastage on top, sides and bottom appears to be similar in both methods. Further experiments on the A.I.V. and ordinary methods are being carried out, and the molasses method is also being investigated.

The authors gratefully acknowledge the assistance given by Mr. D. Gleeson and Mr. A. Vaughan, University College Farm, in conducting the feeding trials.

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3. Rations for Live Stock. Miscellaneous Publication, No. 32 (6th Edn.), Min. Agr. and Fisheries, London.

LOUPING-ILL

Louping-ill is a disease of the nervous system practically confined to sheep, but rare cases have been reported in calves and pigs. It is known in different districts by various local names, such as "staggers," "jumps," "trembling," "shivers," and is so named owing to affected sheep often exhibiting involuntary leaps, spasms, or seizures. It attacks sheep of all ages, but is chiefly met with in lambs.

It has a well-defined seasonal occurrence, the heaviest mortality occurring in the spring and early summer months and a shorter season with fewer deaths during the autumn.

CAUSE AND METHOD OF SPREAD.

It is only recently that research work on the disease has demonstrated the true cause to be what is known as a filterable virus, *i.e.*, a small, specific germ, so small that it cannot be seen by the aid of the most powerful microscope and is capable of passing through a very fine filter.

It has been proved that louping-ill is conveyed from infected to susceptible sheep by the common tick (*Ixodes Ricinus*) so frequently found on sheep and other farm animals, especially when grazing in old, rough pastures. It should be clearly understood, however, that the tick acts only as the carrier of infection. Before ticks can play any harmful part they must have sucked the blood of an infected sheep, dropped off, and in due course found a fresh host in a healthy, susceptible sheep. It is important to note that many sheep in apparently normal health coming from infected farms may have gone through a mild attack of the disease, recovered and acquired immunity against disease. When such animals are introduced into clean flocks, the infected ticks carried by them are liable in due course to infect healthy, susceptible sheep. Similarly, when healthy sheep from a clean farm are brought into an infected farm where disease may be running a mild course, they usually suffer heavy mortality. Indeed it appears that the disease is usually transmitted to clean flocks in one or other of these ways. The greater the number of ticks carried by infected sheep the greater is the chance of infection spreading. For this reason, flocks grazing on old, rough pastures which favour the multiplication and maintenance of ticks generally suffer most from the disease, and such pastures, once infection is introduced, remain infected for years. There are, of course, many farms on which, although ticks are numerous, louping-ill is unknown owing to the fact that infection has not been introduced and the ticks remain free from the virus.

SYMPTOMS.

The symptoms vary according to the forms of disease present, such as the mild, acute, sub-acute or chronic forms.

In the mild form a rise of temperature with slight dulness for a few days may be the only symptoms, and they often escape notice. Sheep passing

through a mild form acquire immunity; ticks feeding on them during the feverish stage become infected with the virus and may pass on the disease to their next host.

In the acute form the affected sheep may show symptoms of depression—hanging ears, fatigue, lagging behind the healthy flock, walking with unsteady gait, and perhaps “high-stepping” action of the limbs. Blood-stained diarrhœa may be present. Collapse follows rapidly, and death usually takes place within twenty-four hours. Sometimes the disease is so rapid that the animal may be found dead with no previous history of illness. The acute form is generally met with during the spring and summer months, and may result in heavy mortality, especially in a season when ticks are plentiful.

The sub-acute form is the most commonly recognised because the symptoms are usually characteristic of the disease. The animal shows staggering gait with “high-stepping” action of the limbs followed by circling movements, eventually falling on its side. In this position it may remain in a comatose condition, but frequently epileptiform seizures occur and convulsive movements of the limbs, followed by death in three or four days. Occasionally the animal survives and the symptoms become chronic.

The chronic form usually develops from the sub-acute form, and is characterised by partial or complete paralysis of one or all four limbs, or of the lower jaw or muscle of the neck, the latter resulting in turning of the head to one side. Animals thus affected may survive for weeks; in fact, cases of ultimate recovery are not unknown.

TREATMENT AND PREVENTION.

Treatment of affected animals by drugs or other means has, so far, failed to give satisfactory results. The sheep owner must rely on preventive measures to reduce his losses.

Owners of clean flocks should be careful when purchasing sheep to see that they come from healthy flocks, for, as already stated, apparently healthy sheep from infected farms may be carriers of infective ticks, and may be the cause of heavy mortality when introduced to clean flocks. All newly purchased sheep of unknown origin should, before mixing with a clean flock, be dipped twice in a non-arsenical approved dip, with an interval of not longer than seven days between the first and second dippings, in order to destroy ticks.

If the introduction of healthy sheep into affected flocks must occasionally be resorted to, it is advisable to introduce such sheep during the late autumn, in order to give the animals a chance to acquire immunity before the louping-ill season starts in the spring.

Complete eradication of ticks would be a certain preventive, but in most farms this is impossible to achieve. Their numbers could, however, be considerably reduced by frequent dippings of the sheep in a non-arsenical approved dip. Affected pastures might be tilled to destroy ticks or grazed by cattle or horses for a year or two.

The above recommendations as to prevention may be difficult to carry out on many farms for economic and other reasons, but they are the only measures available to the sheep owner at the present time.

The most hopeful and satisfactory method of dealing with the disease would be by preventive vaccination, as in the case of blackquarter and some other animal diseases. A satisfactory vaccine would, doubtless, reduce greatly the losses from the disease, but a safe and reliable vaccine is not yet available. The question, however, is at present engaging the attention of veterinary research workers with encouraging results.

J. H. N.

March, 1935.

FIELD BEANS

By J. J. HASSETT, A.R.C.Sc.I., Superintendent, Agricultural School,
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Beans belong to the same family of plants as clovers and vetches and are grouped into two classes according to the mode of culture adopted—garden beans and field beans, the latter sometimes described as “horse” beans. The field bean is one of the oldest of our cultivated plants. It is not known when or how it was first introduced into this country, but it was cultivated here long before many of our present-day crops were heard of. Arthur Young in his book “Tour in Ireland” (1776–1779) records that beans or black corn were included in the rotation in the counties of Wexford and Clare, and that the produce was used for stock feeding when cheap, exported when dear, and in times of scarcity used as human food.

In the year 1852, the first year for which reliable statistics are available, the area under field beans in the portion of Ireland now constituting Saorstát Éireann was 13,342 acres. Two or three years later, however, it had dropped by one half, and by the end of the nineteenth century the cultivation of beans as a field crop had practically ceased except in districts in County Wexford where an interest in the crop was maintained up to comparatively recent years.

Soil.

Although it is generally acknowledged that the bean produces the best results when grown on heavy, well-drained soils of a limestone nature, good results have been obtained on loamy soils and even on lighter soils of a sandy nature. The bean is a deep-rooted plant, consequently it rarely suffers from lack of moisture even when sown on light soils and in dry seasons.

Rotation.

The bean crop has played a most important part in the development of systematic cropping, and in the days before potatoes and root crops were cultivated it was the only crop the growing of which permitted of the thorough cleaning of land. On the introduction of potatoes and root crops the bean ceased to be considered as an important cleansing crop. In view, however, of the extension in the area under cereal crops in Saorstát Éireann the bean crop may again be destined to influence the formation of rotations suitable to present-day conditions. Beans can be sown on lea land after a cereal crop or following potatoes or roots. When sown in rows and adequately cultivated during the early portion of the growing season, beans may be regarded as almost as good a cleansing crop as potatoes or roots. Moreover, since the bean crop is usually harvested early in autumn, there is ample time for the cleaning of the stubble in preparation for the succeeding crop.

Manuring.

Satisfactory crops of beans may be grown on rich soils without farmyard manure. The usual practice, however, is to apply a dressing of the latter at a rate of from twelve to fifteen tons per statute acre. In addition, artificial manures are necessary if good results are to be secured. Potash and phosphates are necessary ingredients in a manure for beans. Nitrogen, on the other hand, appears to have very little effect, especially when farmyard manure is used. Lime exercises a beneficial influence on the development of the crop and a dressing is to be recommended in the case of sour or acid soils. In addition to farmyard manure, a dressing made up of about four hundredweight of superphosphate, Semsol or basic slag, together with about two hundredweight of kainit or similar potash manure per statute acre usually gives good results. When farmyard manure is not being used, the artificial manures should be applied at an increased rate.

Sowing and Cultivation.

Several methods of sowing are practised. The seed is sown broadcast by hand or with the corn drill and covered by harrowing. It is also ploughed in and is sometimes sown in shallow drills in somewhat the same manner as potatoes. When beans were intensively grown in this country the bulk of the crop was sown on lea in ridges, the seed being sown broadcast and covered by shovelling the loose soil from the furrows on to the ridges. Nowadays, beans are usually ploughed in or sown with the corn drill following a corn crop. If the crop is to get adequate after-cultivation and if the growth of weeds is to be kept down, it is essential that the seed should be sown in rows a good distance apart, consequently ploughing-in of the seed is recommended in preference to other systems.

With this method the procedure usually is as follows:—The farmyard manure is distributed evenly over the area to be planted. An opening, or middle, is then made with the plough, and the seed scattered by hand in the first furrow and in every alternate furrow as ploughing progresses. The distance between the rows of beans is regulated by the width of the furrow turned. If a sod about four inches deep and twelve inches wide is cut, the beans will be in rows twenty-four inches apart, which is a convenient distance. After sowing, the ground should be harrowed and rolled if necessary, provided soil and weather conditions are suitable. The artificial manures may be applied to the surface before or after ploughing, or they may be spread in the furrows in which the beans are sown. The seeds should be scattered evenly over the width of the furrows so as to avoid overcrowding of the plants, which is inimical to tillering and uniform podding.

When the seed is sown with the corn drill, the seed-bed is prepared in the usual manner and the seed covered by harrowing afterwards.

Seed.

Field beans are smaller and somewhat different in shape from garden beans. There are few distinct varieties and they are divided into two main groups—winter beans and spring beans. The winter bean, which is hardier than the spring type, is sown during the period from October to January. Spring beans are sown in this country in January and February. Except in the earlier districts, it is not considered advisable to delay sowing beyond the middle of the latter month. The tick bean, the seed of which is relatively small and rounded, is the best known of the spring types.

The quantity of seed required is regulated by the variety sown and the method of sowing. From thirteen to fifteen stones per statute acre are required when the seed is sown in rows about a couple of feet apart. Heavy seeding is not recommended, as a thick braird is not conducive to good podding.

After-cultivation.

As the bean plant bears pods almost down to the base of the stem, it is essential that the plants get light and air, which is best secured by planting in rows. In springtime when the land becomes dry the surface should be harrowed and, when the plants are well over ground, horse-hoeing should be commenced and repeated as often as it is necessary in order to keep down the growth of weeds. Horse-hoeing is usually sufficient to check the growth of weeds between the rows, but if weeds develop between the plants in the rows, hand-hoeing may be necessary. This operation must be done before the plants get too advanced in growth.

Harvesting.

The bean is ready for cutting when the leaves have fallen off and when the pods and stems are turning black. The crop can, however, be cut before it is fully mature, that is, when the stems are still greenish, as it ripens out in stook. If allowed to ripen fully before harvesting, shedding of the seed may take place.

At one time beans were pulled by hand and the practice still prevails in some districts. In general, however, the crop is harvested nowadays with the reaper and binder. The binder should, however, be set to deliver a smaller sheaf than when cutting cereals. This ensures easier draught and less strain on the machine. Should it not be possible to cut the crop with the binder, it is rather tedious to harvest, as the sheaves must be hand-tied with straw ropes or other material. Beans, however, invariably resist lodging. After cutting, the crop should be left in open stooks for some days to season. Indifferent weather at this stage affects the bean less than cereal crops. After about two weeks in stook, depending on weather conditions, the crop can be carted and ricked. The usual practice is to leave the beans to season in the rick or stack for a few months before threshing, as it is believed that beans are better for feeding when fully matured.

Threshing.

Beans can be threshed and cleaned by the ordinary threshing mill, but the concave of the drum must be opened to facilitate feeding and to avoid breaking the beans. If intended for feeding purposes, broken beans do not matter, but in seed samples they are to be avoided. Operators working on the threshing mill should wear goggles as a protection against the beans, which are often ejected from the drum with great force.

Yield.

The yield varies, depending upon the season, manuring and method of cultivation. Shedding in the stook and attacks of insect and fungoid pests also materially affect the returns. The average yield of dressed beans varies from 25 to 30 cwt. per statute acre.

The Feeding of Beans.

All the cereal crops cultivated in this country, as well as roots and potatoes—which form the bulk of the foods available for the winter feeding of stock—are relatively rich in carbohydrates or starchy material and deficient in proteins. In compounding rations, the insufficiency of the protein has to be made good by the addition of such foods as cakes, which are mainly imported and expensive in comparison with home grown foods. Beans, though not containing as high a percentage of protein as decorticated cotton or ground nut cake, are nevertheless rich in this constituent and are, therefore, capable of replacing most cakes in general use. Moreover, beans when crushed make a palatable meal which is relished by practically all classes of farm stock. Bean meal is best used in a coarsely-ground condition.

When fed alone, or even in liberal quantities in a mixture, especially to pigs, bean meal has a tendency to swell in the stomach of the animal, giving rise to digestive troubles. This risk can, however, be avoided by damping or steeping the meal some hours before it is fed. Where the meal is used in small quantities, or when it is included in a mixture with other meals, there is practically no danger of digestive troubles arising and it may be fed in dry condition.

Bean straw usually contains more nutritive material than the straws of cereal crops, but as it is coarse and unpalatable it is not suitable for feeding except in very small amounts and when chaffed and mixed with other foods. Usually bean straw is converted into manure.

THE FOOD VALUE OF OAT HULLS

By E. J. SHEEHY, F.R.C.Sc.I., B.Sc., University College, Dublin.

In the preparation of oatmeal the palae, commonly known as the hulls, of the oat become a by-product. With an extension of the dehulling practice consequent on an increased use of oat kernels or groats for the purpose of replacing other concentrated carbohydrate foodstuffs, the quantity of the hull by-product would become considerable. Hulls are used, among other purposes, for litter and for feeding to farm stock. Their particular use for the latter purpose has been tested by the Animal Nutrition Department of University College, with a view to having a direct comparison between them and a comparable feeding material. They were compared with hay, but in view of the unsuitability of oat hulls to form the sole diet of an animal even for a short period, it was considered desirable to make the comparison under conditions where both formed part of a compound ration.

Calves which had previously been on pasture were made the subject of the investigation. A group test was conducted on animals which at the beginning of the experiment were 8 months and at the termination 13 months old. In addition, a digestion test was carried out on two 14-months old calves. For the group test ten calves were divided into five pairs, each pair forming an experimental group. They were weighed at the beginning and at intervals of three weeks afterwards till the test terminated. The calves were chained up in a byre, so that they were capable of being individually fed.

The feeding consisted of oat hulls and steeped sugar pulp (molassed beet pulp) in the proportions of 2 to 1 by weight to one individual of each of the five pairs, and of hay and steeped sugar pulp in the same proportions to the others. In the former lot the hulls were mixed with the pulp, while to the latter the hay and pulp were separately fed. In fact it was found necessary to seek a substance which, when mixed with the hulls, would make a palatable mixture, and steeped pulp served the purpose admirably. The calves ate the mixture quite well, though their appetite was not as keen as those on the hay and sugar pulp. Both oat hulls and sugar pulp are deficient in proteins and minerals as well as in certain vitamins, including A and D, which the calf requires in moderate quantity for normal growth. Shortage of vitamin D was obviated by the admission of direct light through open doorways, and, though in view of the limited vitamin A requirements of calves and also of the store of that vitamin previously accumulated in the body, the inadequacy of vitamin A was not likely to become apparent during the experimental period, cod liver oil, which is rich in vitamin A, was fed at the rate of 1 ounce per day to each of three calves, both in the hay and in the oat hulls group. The appearance and progress of the cod liver oil-fed calves did not, however, differ from those which did not receive cod liver oil at any stage in the experiment. The protein and mineral

requirements were provided by giving each calf in addition to the other foods mentioned half a pound daily of the following mixture :—

Earth nut cake	..	..	..	..	5 parts
Meat and bone meal (50% albuminoids)	..	..	..	..	5 „
Common salt (NaCl)	..	..	..	..	1 part
Sterilised bone flour	..	..	..	..	1 „
Ground limestone	..	..	..	..	1 „

Thus, oat hulls and hay were directly compared with one another from the point of view of their available energy, the deficiency of the hulls in other respects not operating as a limiting factor. Water, *ad lib.*, was provided throughout the experiment.

The hay provided was a good sample of meadow hay of the type fed to the general farm stock. The oat hulls were from white oat varieties, and were procured from an oatmeal milling firm. The chemical analyses are shown below.

				<i>Oat Hulls.</i>	<i>Hay.</i>
				%	%
Water	..	..	..	10.5	16
Dry matter	..	..	..	89.5	84
Crude protein	..	..	..	3.94	8.00
Ether extract	..	..	..	1.48	1.42
Carbohydrate—soluble	..	..	..	52.17	40.40
„ fibre	..	..	..	28.26	27.55
Ash	..	..	..	3.65	6.63

The quantities (in pounds) of food consumed were as shown in Table I.

TABLE I.

				OAT HULL GROUP			HAY GROUP		
				<i>Hulls</i>	<i>Pulp</i>	<i>Meals</i>	<i>Hay</i>	<i>Pulp</i>	<i>Meals</i>
1st 3 weeks	..	..	..	5½	2¾	½	5½	2¾	½
Next 3	„	..	..	6	3	½	6	3	½
Next 3	„	..	..	6½	3½	½	6½	3½	½
Next 6	„	..	..	7	3½	½	7	3½	½
Last 6	„	..	..	9½	3½	½	7	3½	½

These quantities represented what the oat hull group cleaned up in a reasonable time after feeding, the hull group being fed practically up to the limit of appetite. The hay group would have eaten more, especially towards the end of the test. After fifteen weeks it was seen from the weights record that oat hulls were not equivalent in nutritive value to an equal quantity of hay. For the remainder of the feeding period the daily oat hull allowance was increased while the hay in the hay group and the other items of dietary in both groups were unchanged.

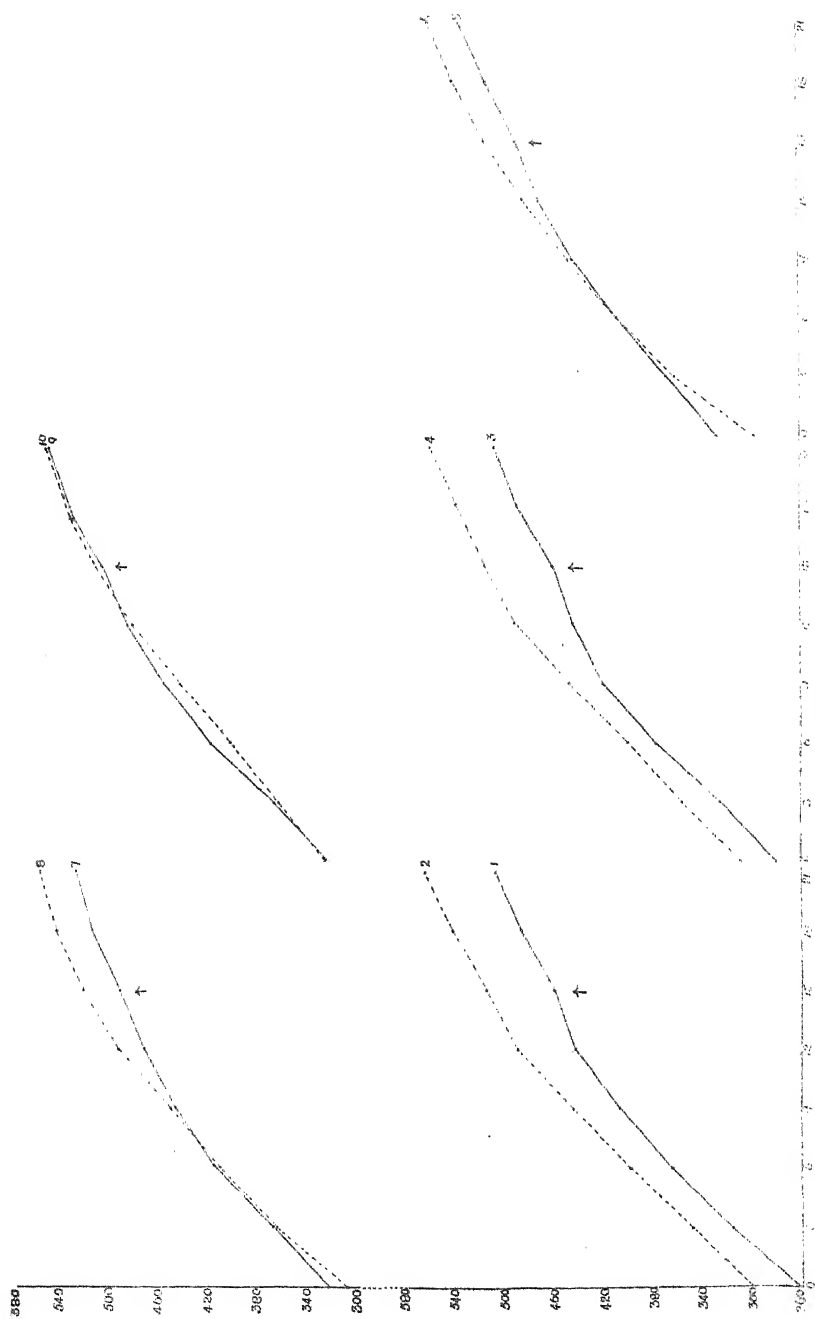


FIGURE I.

The figures on the ordinates (vertical lines) represent animal live weight in pounds, and those on the abscisse (horizontal lines) the time, in weeks, after the start of the experiment.

The continuous curved lines show graphically the weights of the individual animals--1, 3, 5, 7, 9-- in the oat hull group; the broken curved lines record the weights of comparable animals which received hay.

Figure I is a graphical representation of the weights of the individual animals during the experiment, and Table II shows the gains made.

TABLE II.

	Gain (in pounds) in successive 3-weekly periods						
	1st	2nd	3rd	4th	5th	6th	7th
Calf No. 1 (hulls) ..	56	48	43	36	17	27	21
2 (hay) ..	48	48	48	46	25	28	23
3 (hulls) ..	45	52	43	24	17	29	18
4 (hay) ..	48	44	47	45	24	28	21
5 (hulls) ..	45	48	35	27	19	24	20
6 (hay) ..	41	40	39	37	31	26	20
7 (hulls) ..	46	50	29	26	19	22	14
8 (hay) ..	37	46	40	42	29	22	15
9 (hulls) ..	44	52	37	30	21	24	19
10 (hay) ..	39	37	41	36	29	22	18

Figure I and Table II, taken in conjunction with Table I, show clearly that oat hulls are inferior to good meadow hay, weight for weight. The difference was not pronounced in the early part of the test, but the oat hull-fed animals gradually fell behind those fed on hay up to the end of the 15th week, when it was decided to endeavour to adjust the rations in such a way as might ensure similar live weight increase in the two groups. As shown in Table I the hay group ration was unaltered while the hulls of the other group were increased. Thus the test developed into a comparison of $9\frac{1}{2}$ parts by weight of oat hulls with 7 of hay. For the remaining 6 weeks during which this comparison continued the animals in both groups made similar progress, showing that these quantities of oat hulls and of good meadow hay had approximately the same nutritive value.

From the nature of these two foods it is clear that a difference in nutritive value is accounted for on the score of digestibility. In order, therefore, to check the results obtained by the group test a digestibility experiment was arranged with two 14 months old cattle and carried out in the digestion crates* erected at the College. In this experiment, as in the group test, it was necessary to feed sugar pulp in conjunction with the oat hulls, and, in order to render the diets comparable, sugar pulp was fed with the hay also. The two bullocks were fed alike so that one acted as a check on the other. Each was given 11 lb. of oat hulls and 4 lb. of sugar pulp for the first period of the experiment and 8 lb. hay and 4 lb. of sugar pulp for the second period.

*Described in Sc. Proc. Roy. Dub. Soc. Vol. 21 (N.S.) No. 18 (1935).

Each period was of 14 days duration. During a preliminary 5 days prior to each period, the animals were fed on the experimental diets of hulls and pulp and hay and pulp respectively. Water, *ad lib.*, was provided.

The following are the relevant data.

1ST PERIOD.				
<i>Daily Diet</i> :—			<i>Total Dry Matter.</i>	
11 lb. Oat hulls ..	..	..	..	9.84 lb.
4 lb. Sugar pulp ..	..	..	..	3.30 lb.
			<hr/>	
			13.14 lb.	

<i>Faeces</i> :—			<i>Animal A.</i>	<i>Animal B.</i>
Total faeces ..	..	..	308 lb.	352½ lb.
% dry matter ..	..	..	24.3	27.4
Total dry matter ..	..	..	96.7 lb.	96.5 lb.
Average daily dry matter ..	..	..	6.90 lb.	6.90 lb.
			<hr/>	
Daily dry matter—average of two animals ..			6.9 lb.	

2ND PERIOD.				
<i>Daily Diet</i> :—			<i>Total Dry Matter.</i>	
8 lb. hay ..	..	..	..	6.72 lb.
4 lb. sugar pulp ..	..	..	..	3.30 lb.
			<hr/>	
			10.02 lb.	

<i>Faeces</i> :—			<i>Animal A.</i>	<i>Animal B.</i>
Total faeces ..	..	..	309½ lb.	289½ lb.
% dry matter ..	..	..	16.3	17.35
Total dry matter ..	..	..	51.33 lb.	50.23 lb.
Average daily dry matter ..	..	..	3.67 lb.	3.59 lb.
			<hr/>	
Daily dry matter—average of two animals ..			3.63 lb.	

TOTAL DRY MATTER (per day).

	<i>Diet.</i>	<i>Fed.</i>	<i>Evacuated.</i>	<i>Retained.</i>
1ST PERIOD	{ 11 lb. oat hulls 4 lb. sugar pulp }	.. 13.14 lb.	6.9 lb.	6.24 lb.
2ND PERIOD	{ 8 lb. hay 4 lb. sugar pulp }	.. 10.02 lb.	3.63 lb.	6.39 lb.

On the assumption that the difference between the 6.24 and the 6.39 is not significant, the conclusion to be drawn from this experiment is that the amount of dry matter retained by the beast from a diet of 11 lb. of oat hulls and 4 lb. of sugar pulp is similar to that retained from a diet of 8 lb. of hay and 4 lb. of sugar pulp.

The group feeding test showed that the quantities of oat hulls and of hay which are equivalent to one another are $9\frac{1}{2}$ lb. and 7 lb. respectively. This is equivalent to the ratio of 11 to 8.1, which approximately represents the quantities found in the group experiment to have similar nutritive values.

It is possible that the value of oat hulls in relation to good quality meadow hay may be somewhat higher in the older animal, though the difference in this respect as between yearling cattle and adults cannot be considerable.

Experiments have been done elsewhere on the digestibility of oat hulls and on the comparison between hulls and other foods such as bran, but in view of the variability in the composition of the oat hulls and of such food-stuffs as hay and bran fed in different countries no useful purpose would be gained by labouring a comparison of the results obtained.

SUMMARY.

The comparative food values to young cattle of white oat hulls and of good quality meadow hay have been determined both in a group experiment and in a digestibility test.

Both the hulls and the hay were fed in conjunction with sugar beet molassed pulp, and in the group experiment a protein and mineral supplement was also included in the diet.

Eleven parts by weight of oat hulls of the composition given in the text were found to have a nutritive value similar to 8 parts of hay of the composition given in the text.

Oat hulls may be conveniently fed to cattle in a mixture with steeped sugar pulp. Such a mixture, supplemented by a small quantity of proteins and minerals, provides for satisfactory progress even in the case of young cattle.

BOTANIC GARDENS : ORIGIN, HISTORY AND DEVELOPMENT

By J. W. BESANT, A.M.R.H.S., Keeper of the Botanic Gardens.

In the "Guide to the Botanic Gardens," revised and enlarged edition published in 1885, we are told that "about the year 1790 the Members of the Right Honourable and Honourable Dublin Society resolved to form a Botanical Garden for promoting scientific knowledge in the various branches of agriculture and planting, as well as to foster a taste for practical and scientific botany. This resolution was soon afterwards carried into effect, and the present establishment was founded and endowed by the Irish Parliament."

It is clear that while the actual formation and subsequent management of the new garden was to be under the control of the Dublin Society, the bulk of the financial backing came from the Irish Parliament; the Gardens have, therefore, had a national significance for one hundred and forty-four years, although they did not come under direct control of a Government Department until ninety years after being founded. The first Parliamentary Grant of £300 was made in 1790, and subsequent grants were added, so that in 1794 a sum of £1,700 was available, and Parliament directed that the whole of this money should be applied towards providing and maintaining a Botanical Garden. A Committee was appointed to make the necessary arrangements for securing a suitable site and to begin the layout of a garden.

In all the movements towards founding a Botanic Garden no one seems to have been more active and enthusiastic than Mr. Speaker Foster (afterwards Lord Oriel). In the "Dublin Magazine" of July, 1800, in which there is a plan and description of the garden as it then appeared, we read: "In the planning and executing of this garden it has been uncommonly fortunate that the abilities and assistance of the first-rate character which this Nation or any other can boast of, were most condescendingly and arduously exerted to further this great national object, and while the name of Foster remains respected and beloved by every Irishman, so long will this garden perpetuate the taste and abilities of this great and good man."

According to J. Reynolds Green in his "History of Botany in the United Kingdom," the Committee included Dr. Wade, the Dublin Society's Lecturer in Botany; Dr. Hill, Professor of Botany in Trinity College; and Dr. Percival, Secretary to the Royal Irish Academy. The Lord Bishop of Kilmore reported to the Society on behalf of the Committee in March, 1795, that, after examining various sites, none had been found more suitable than the demesne of Major Tickell, at Glasnevin, some two miles from Dublin Castle. The area chosen was held on lease, and it was recommended that the interest in the lease should be purchased. This the Society agreed to, and the work of laying out the garden was proceeded with. The original

area was about twenty-seven statute acres, on the geological formation known as calpe limestone, the main part consisting of thin loam resting on gravel. Had the promoters been able to visualize the enormous number of hardy plants to be introduced during the following one hundred years they must surely have selected another site, for a poorer soil or one less likely to produce the best results could scarcely have been found. The advice of a good practical gardener or farmer would have been of inestimable value to the Committee.

The site now being acquired, rapid progress was made in developing the area as a Botanic Garden, chief regard being given to agriculture and horticulture in so far as they could be helped by the botany of the time. Dr. Wade, one of the earliest botanists to work on the native flora of Ireland, became responsible for the scientific side, while Mr. John Underwood, A.L.S., recommended by Curtis, founder of the "Botanical Magazine," was appointed Curator, with charge of the practical management of the garden and plants. He had as assistant, Mr. John White, who had been recommended by Foster. White subsequently wrote a valuable treatise on the "Indigenous Grasses of Ireland and their use in Agriculture".

The Garden at this time (1795) was laid out partly on botanical lines and partly in sections demonstrating the different plants deemed useful in agriculture and horticulture. Thus in the "Dublin Magazine" of 1800, only five years after the site had been acquired, there is a prospectus and plan of the Dublin Society's Botanic and Agricultural Gardens at Glasnevin, in which the various divisions are shown and briefly described. The first part is described as *Hortus Linneensis*: this was the collection of herbaceous plants, foreign and domestic (? native), arranged according to the system of classification devised by the celebrated Swedish naturalist, Carl Linné, still known as the Linnaean classification, though no longer in use. Then followed the Cattle Garden, with plants useful for cattle feeding; the Esculent Garden, with vegetables useful to man; the Dyer's Garden, containing plants producing dyes; the Hay Garden, which was extensive, and contained all the plants from which hay could be made; and the Nursery, described as an essential appendage to every garden of consequence. There were also the Grass Garden, Medicinal Garden, Hibernian Garden, and special sections for alpine, aquatic, bog and marsh plants; and plans were under consideration for erecting suitable apparatus for the cultivation of marine or seaside plants, though it was rightly recognised that "the execution of it will be attended with much difficulty and expense." There was also an Orchard containing a standard collection of hardy fruits. This was situated where part of the Oak collection is now accommodated and near the present economic collections, which, though now somewhat reduced in extent, are the direct descendants of the collections formed over one hundred years ago. The Orchard, however, does not seem to have come into being until about 1836.

Exotic plants from warmer countries were not forgotten, and already one large greenhouse had been erected and furnished with a valuable collection

of curious plants, being particularly rich in the wild heaths of South Africa, no less than one hundred and fifty species being in cultivation, and for many years afterwards the heaths at Glasnevin were famous. Contiguous to this house others were being erected for the propagation of all the choice and newly-introduced plants of that time. There was also an extensive collection of trees and shrubs, including, no doubt, those planted in the demesne by previous owners, such as the old yews forming the "Yew Walk," and the ancient "Cedar of Lebanon" to the west of the present herbaceous borders. In 1801, but six years after the laying out of the Gardens, so great had the collections of plants become that a catalogue of Green and Hot House Plants cultivated in the Gardens was compiled by Mr. Underwood, Curator; and in 1802 a similar catalogue of Trees, Shrubs and Herbaceous Plants. It does not appear that any complete catalogue of the collections has been published since.

In 1804 the Building Committee reported that during the four preceding years £9,473 had been expended on buildings at the Botanic Gardens. Nine years later, in 1813, the exotic indoor plants had so increased in number and size that want of accommodation to grow them properly was seriously felt, and another range of three houses was built near the entrance gates.

The original gate-lodges were built in 1815 at the expense of Thomas Pleasants, a member of the Dublin Society.

The principal range of hothouses having become faulty, and the site unsuitable, it was recommended that they should be removed to the position where the Palm House now stands, and this was accomplished in 1817-19. What was called the Octagon House, because of its shape, a structure 40ft. high, was erected in 1819 where the Tree Fern House now stands, to accommodate a large Norfolk Is. Pine (*Araucaria excelsa*), but the plant died during the operation of moving it.

During the next eleven years, that is, up to 1830, fewer changes were made. In 1825 the celebrated Dr. Wade died, and Dr. Samuel Litton became the Society's Professor of Botany. In 1830 extensive alterations and improvements were instituted at the Gardens. The Cattle and Hay Gardens were abolished, leaving more ground available for scientific purposes. The area devoted to trees and shrubs was enlarged and more space given to the arrangement of plants in Natural Orders, or Families. The Curator, Mr. Underwood, who had held office for thirty-six years, had now reached an advanced age and was no longer able to supervise these extensive changes. He was succeeded in 1834 by Mr. Ninian Niven, who eventually became Director. He practically remodelled the Gardens, and the part from the entrance gates to the end of the pond is almost as Niven left it as regards the general lay-out. Niven was a skilled landscape gardener as well as a botanist and cultivator: the beautifully curved walks in the older parts of the grounds are an enduring testimony to his taste for natural effect. The hothouses were now put into better repair, the indoor plant collections greatly augmented, and a different class of labour introduced. Young gardeners were admitted for professional training, and generally a more

enlightened policy was pursued. It may be noted here that the training of young men as gardeners has continued ever since, that is, for exactly one hundred years. Two or three ladies have been admitted for training annually for the past thirty-eight years.

In 1838 Niven was succeeded by Mr. David Moore, who had been assistant to J. T. Mackay, Curator of the Trinity College Botanic Gardens, Ballsbridge. Mackay was a trained horticulturist, but gave much time to the study of the Irish flora, and was given the honorary degree of LL.D. David Moore was also a trained gardener, but gave much attention to the cryptogamic flora of Ireland, and in recognition of his work and help was given the honorary degree of Ph.D. by the University of Zurich. He also collaborated with A. G. More in the "*Cybele Hibernica*."

The improvements commenced by Niven were continued and further alterations were carried out. The old hothouses, now probably beyond repair, were removed, and the curvilinear range of wrought-iron houses was erected in 1843. This was erected at the expense of the Royal Dublin Society, supplemented by a grant of £4,000 from the Government. The erection was done by Turner, of the Hammersmith Works, Dublin, who also built the large Palm House at Kew.

Dr. Litton, the Society's Botanist, died in 1845, and was succeeded by Dr. Harvey, a native of Limerick, who had travelled extensively, and was apparently interested in botanical science, the actual work of the Gardens being carried out by the Curator. The Society's Botanist had up to this delivered a certain number of botanical lectures in the Gardens, and some at the Society's house in Kildare Street. In 1854, however, the Government made a change, stopping the lectures at the Gardens and transferring them to the College of Science, where they were delivered by the Professor of Botany, who then, as now, brought his class to the Gardens for occasional demonstrations. All the plant material required for teaching purposes in the College was supplied from the Gardens, as well as material required in the School of Art. These arrangements continue, but many more specimens are now supplied to Technical Schools, Colleges, etc.

The Victoria Regia House was built in 1854-55, and the second range of conservatories, of which the large Palm House forms the centre, was finished under the direction of the Board of Works in 1862. This Palm House was designed by the Board's Architect, Mr. James Owen, the cost being defrayed by the Government; it was so severely damaged by autumn gales in 1883 that a new and larger structure was built over it by Messrs. Boyd, of Paisley, in 1884, at a cost of £5,000.

From 1854 until 1877 the money required for the maintenance of the Gardens was included in the vote for the Science and Art Department, but was administered through the Royal Dublin Society. By Act of Parliament in 1877 the Society gave up all control of the Gardens as well as of the Museum and School of Art, all coming directly under the Science and Art Department.



Herbaceous Border, Botanic Gardens, Glasnevin

Dr. Moore died in 1879, having been Curator for forty-one years, and was succeeded by his son, Mr. F. W. Moore, who later became Sir F. W. Moore. At this time the extent of the Gardens was stated to be thirty-one acres, and almost immediately a further extent of some twelve acres was added, now known as the West Arboretum. Great changes were then initiated to bring the collections into line with modern botanical collections, and to include the ever-increasing number of new introductions. Old and redundant groups of common evergreens were cleared out, old trees removed, and new collections begun in the recently added area, which had been levelled, graded and laid out with walks. During this period the conservatories were stocked with a fine collection of tropical plants, and especially fine collections were formed of Cycads, Palms and Orchids, the latter probably one of the finest extant.

In 1901 the Gardens were transferred to the Department of Agriculture and Technical Instruction, and remain to-day under the administration of the Department of Agriculture.

In 1907 the collections had become so large that an addition to the technical staff became imperative, and the Department arranged for the appointment of an Assistant Keeper. In April, Mr. C. F. Ball was appointed. He unfortunately lost his life at the Dardanelles in 1915.

Sir F. W. Moore retired in 1922, having been Keeper (Curator) for forty-three years. It may be noted here that the title of "Curator" was superseded by that of "Keeper," when the Gardens, together with the National Museum, National Library, etc., were under the Director of Science and Art.

From 1922 onwards the policy of improving and extending the collections has been pursued. No further expansion is possible, and additions can be made to the collections only by reducing duplicates and utilising every part to the utmost. The Rock Garden has been enlarged and much of it rebuilt; the Mill Field, a small area between the River Tolka and the Mill Race, at one time a Willow Garden, and latterly only in grass, is being planted with Rhododendrons, Conifers, etc., and the bank of the stream with moisture-loving plants. Old yards have been cleared out, planted, and opened to visitors, and a new yard with frames and propagating houses formed in the South Field, an area of ten acres added to the Gardens in 1898, and used for nursery work.

THE GARDENS TO-DAY.

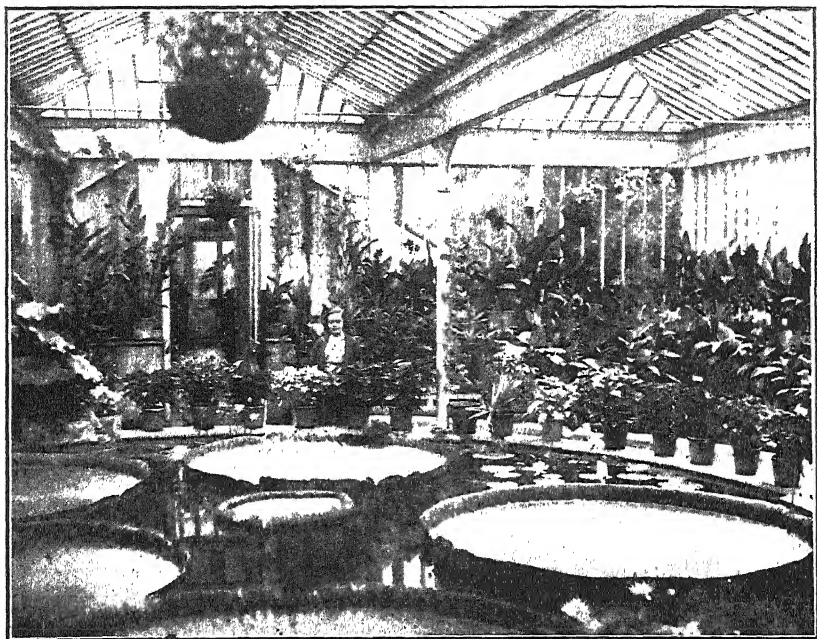
The first object of a Botanic Garden is to promote the study of Botany, one of the fundamental sciences underlying the practice of Agriculture, Horticulture, and Forestry. There is probably no country of any note without a National Botanic Garden, and many countries have more than one, including Municipal Gardens as distinct from Public Parks or Recreation Grounds. As will be seen from the above notes, the promoters of the Botanic Gardens, Glasnevin, had in view not altogether the study of botany as science only, but its application to agriculture and horticulture.

Non-botanical visitors will probably see many plants—to them unattractive, but of profound interest to botanists or students interested in one or other of the many sections into which botany is now divided: Morphology, Physiology, Cytology, Mycology etc.

The National Botanic Gardens are easily reached by tram from the city, two lines (19-20) passing the entrance at short intervals. Entering by the turnstiles the visitor passes on the right the Garden Office and Library, and on the left a group of residential buildings. Bearing to the right past the office, he will find on the right a wide shrubbery containing many interesting shrubs, new and old, including *Choisya ternata*, *Xanthoceras sorbifolia*, *Viburnum fragrans*, and *V. grandiflorum*, *Myrtus Luma*, *Abelia triflora*, and the Chinese Fan Palm, *Trachycarpus Fortunei*. In front of this shrubbery is a narrow border, full in spring of early-flowering plants, succeeded in summer by a varied arrangement of summer flowers. On the left is a wider border planted with herbaceous plants—Paeonies, Phloxes, Delphiniums etc. Immediately in front is the Tree Fern House, in the porches of which there is a good collection of the smaller ferns from warm countries, while in the large house are found fine specimens of the lofty Tree Ferns with huge fronds typical of the fern gullies of New Zealand, Australia, Ceylon and other moist regions. On some of the stems grows the rare *Tmesipteris tannense*, allied to the Club Mosses. On the side benches of this house there is a good collection of ferns from the cooler regions. On the left is a short passage, and here in a wide case will be seen specimens of the “Killarney Fern” (*Trichomanes radicans*), *Todaes*, *Hymenophyllum*, and other “Filmy Ferns.”

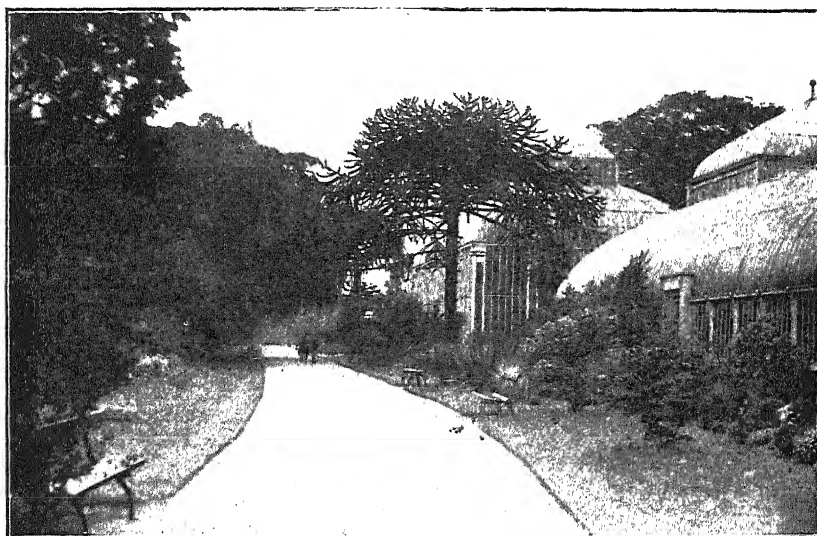
Emerging from the passage the visitor is in the Victoria Regia House. This fine structure has a central round tank heated with pipes, and every summer the giant water-lily, *Victoria Regia*, native of the Amazon, is here one of the sights of the Gardens. The immense leaves, 6-7 ft. across, and the large fragrant flower are a source of wonder and enjoyment to young and old. The side tanks contain tropical water lilies of various colours—blue, pink, and white. In the same house is seen the Egyptian Lotus (*Nelumbium speciosum*) and Papyrus Antiquorum, a huge Sedge from the banks of the Nile, reputed to be the source of the paper on which ancient manuscripts were written. On the walls and roof many tropical gourds and other climbing and twining plants are grown. In winter the Lilies and Gourds are removed, the central tank dried off, and the house filled with Chrysanthemums.

Mounting a few steps from the Victoria Regia House, the Cactus House is reached. This is a double span-roofed structure in two compartments, and contains a representative collection of the weird and curious plants peculiar to the arid dry regions of the world, and commonly called “Cacti,” though many of them belong to other families. The African Aloes and American Agaves are features here, also the Giant Spurges (*Euphorbias*), *Phyllocactus* with beautiful flowers in early summer, the “Old Man Cactus,” *Cereus senilis*, and many other curious succulent plants.



[Photo by courtesy of "The Irish Press"]

The Giant Water Lily "Victoria Regia," Botanic Gardens, Glasnevin.



[Photo by courtesy of "The Irish Press"]

Long Walk and part of the Conservatories, Botanic Gardens, Glasnevin

Leaving this house, the visitor crosses to the Curvilinear Range, built by the Royal Dublin Society in 1843. The first section is the Cool House, or Greenhouse, devoted to plants from temperate regions. Here will be seen many plants from Australia, Chili, New Zealand, South Africa and the Himalayas. Prominent among them are the Acacias or "Wattle Trees," many with beautiful flowers in early spring; some Chinese and Indian Rhododendrons, too tender to grow in the open; the silver-leaved *Astelia Banksii* from New Zealand, and the "Silver Tree" (*Leucodendron argenteum*) from Table Mountain in South Africa. Many of the plants are placed out of doors in the summer, and the house is furnished with groups of decorative flowering and foliage plants.

In the loftier central house are specimens of Conifers from the Southern Hemisphere, South Africa, Chili, etc.; notably the "Kauri Pine" (*Agathis australis*); Araucarias from Queensland and New Caledonia; and here, too, the Banksias from Australia frequently display their curious flowers.

The next section is the Tropical or Stove House, where the temperature is much higher. Of great importance here is the collection of economic plants, including the Sugar Cane, Coffee, Cocoa, Pineapple, Cinnamon, Pepper, and many plants yielding tropical fruits, spices and condiments. The centre and front of the house contain a very fine collection of tropical plants of many families, including the Browneas of the Pea family, but with beautiful pendulous bunches of salmon-red flowers very unlike the Pea. On the roof are many climbing and twining plants—Allamandas, Combretums etc.; and on the bench on the north side a fine collection of plants of the Pineapple family (*Bromeliaceae*), many of them of wonderful colouring and remarkable for the way in which the leaves hold water.

Leaving this house, crossing the main walk, and bearing to the left, the Orchid House is reached. Here is part of the Orchid collection, one of the most important in the Gardens. There are two houses, and there is scarcely a day in the year without an Orchid of some kind in flower, though at certain seasons the display is greater than at others. Hanging from the roof are examples of the Pitcher Plants (*Nepenthes*), curious plants from Borneo, the Malay Archipelago and similar regions. In the entrance porch during the summer are seen the North American Pitcher Plants (*Sarracenias*), some of which are hardy enough to grow outside and have actually become naturalised on a bog in Roscommon. The next section contains more tropical ferns, notably the Maidenhair Ferns (*Adiantum*), and a good collection of the Stag's Horn Fern (*Platyserium*). Hanging from the roof are baskets containing examples of the Giant Club Mosses of the tropics.

The Palm House is now reached, and here the visitor gets a good impression of tropical vegetation. The house is seventy feet high from floor to roof, fifty Palms and gigantic tropical Bamboos reaching nearly to the top. The variety of Palms is too great to enumerate, but includes the Sugar Palm, Ivory Nut Palm, Wax Palm, Date Palm, Fan Palm, and many others.

The collection of Cycads is worth attention, the number of species is large

and many of the specimens are of rare beauty. Beautiful specimens of *Angiopteris* and *Marattia* (Giant Ferns) are also on view.

Leaving the Palm House by the opposite door, the Camellia House is entered. Large bushes of Camellias give the house its name, but on the centre bed are also huge specimens of *Gleichenias*, Australian Ferns of great beauty. The side benches of this house are bright with popular flowering plants all the year round. Perhaps at no time is it more admired than in July, August and September, when one whole side is filled with *Begonias*, many basket varieties hanging from the roof.

Emerging from the Camellia House and turning to the right, the visitor enters the Herbaceous Walk, on each side of which there is a border twelve feet wide planted with a fine collection of hardy herbaceous plants in groups and arranged to provide a display from March to October. In spring there are Daffodils, Tulips, Wallflowers, *Aubrietias*, *Polyanthus*, *Anemones* etc., followed in summer by *Lupins*, *Pyrethrums*, *Paeonies*, *Delphiniums*, *Aconitums*, *Helianthus*, *Heleniums*, *Asters* etc., supplemented by half-hardy annuals, such as *Stocks*, *Zinnias*, *Verbenas*, to replace the spring flowers. Behind and to the left of these borders are many beds, varying in size and containing herbaceous plants arranged according to their families. This systematic arrangement extends back to near the entrance gates, and is largely used by university and other students. The greater part of it is reached by way of the Students' Walk.

Near the end of the Herbaceous Walk the Rock Garden begins. Of recent years this has been extended and rebuilt to accommodate the ever-increasing number of new introductions from the high mountains of many lands, and is full of interest at all seasons. Turning to the right, past the Rock Garden, and crossing the Yew Walk, the visitor reaches the lower part of the Gardens. Still keeping to the right, Bamboo Walk is reached, joining River Walk. Clumps of Bamboos in great variety are a feature here, many clumps extending along the Mill Race and river banks. In spring *Snowdrops* and *Daffodils* are in profusion on the banks and grass slopes, and in autumn *Colchicums* keep up the display. All about this area and on the north side of the Rock Garden are many *Rhododendrons*, varying from tiny creeping species a few inches high to large bushes with immense leaves and large trusses of flowers. The display usually begins with the flowers of *Rh. mucronulatum*, *Rh. dauricum*, *Rh. parviflorum* and *Rh. Fargesii*, finishing in August with *Rh. auriculatum*.

At the end of Bamboo Walk the old Mill Race is reached, a path following the Mill Race to the sluice gates. Between the Mill Race and the River Tolka is an area of several acres known as Mill Field, formerly subject to flooding but of late years considerably raised, and now being planted with *Conifers*, *Rhododendrons* etc.; while the banks of the Mill Race are planted with *Primulas*, *Meconopsis* and many other plants requiring moist conditions. This area, still in course of development, is not yet open to the general public.



[Photo by courtesy of "The Irish Press"]
Entrance to Rock Garden, Botanic Gardens, Glasnevin



[Photo by courtesy of "The Irish Press"]
View from Rock Garden, showing Azaleas and Rhododendrons,

Returning to River Walk, the Pond is on the left and the River Tolka on the right. The Pond in summer is beautiful with many varieties of hardy Waterlilies—white, pink, crimson and pale yellow. The giant Nuphar polysepalum and many other species, as well as a host of native and introduced aquatics, such as the Bog Bean (*Menyanthes*), Water Violet (*Hottonia*), really of the Primrose family, the Water Soldier (*Stratiotes*), the Golden Rod (*Orontium*), the native and the large Arrow Leaf (*Sagittaria*), the Bulrush (*Scirpus*), Reed Mace (*Typha*), Flowering Rush (*Butomus*), and the Canadian Rice (*Zizania*), make the Pond interesting for many months. About the margins of the Pond are beds of different sizes filled with a great variety of plants requiring bog conditions, and here and there large plants of Chilian Rhubarb (*Gunnera*), clumps of Pampas Grass and Bamboos, all help to make this one of the most popular parts of the Garden. On both sides of the Pond are many species of Firs and Spruces and a fine tree of the deciduous Cypress.

Turning left at the end of the Pond the visitor passes the Chain Tent, an iron structure covered by three kinds of Wistaria. On the right is a shrubbery containing many fine Chinese shrubs and trees. Continuing upwards, Pine Hill is on the left and the West Arboretum to the right. Lower Pine Hill contains many species of Pinus, Cedrus, Torreya etc., and Upper Pine Hill some Pines, including a good specimen of Pinus Montezumae, and many species of Cupressus, Juniperus, Thuya, Cryptomeria etc. The West Arboretum has collections of Maples, Ash, Birch, Alder, Beech, Hornbeam, Walnut, Chestnut, Elm, Lime, Thorn and Holly, and on the end wall a good collection of Ivies. Following the path with Upper Pine Hill on the left, the Yew collection is passed on the right, and at the end of the Yews the Oak collection is reached. Here are many specimens of Oak, though none is of great size. At one corner are some old Hickory trees (*Carya*).

Turning to the right into West Walk, the Vine Border Walk is reached. On one side of this walk is a high wall enclosing a nursery garden, and this is clothed with a rich collection of climbers and other shrubs requiring support or protection. In front of the wall is the Iris collection containing a good selection of May and June flowering Irises, and in front of them a collection of Crocus species in groups. On the left the walk is bounded by a thorn and holly hedge, in front of which there is a collection of Paeonia species. Continuing along the walk a collection of Michaelmas Daisies is seen.

Emerging from Vine Border Walk, the visitor comes to the economic collections, where culinary vegetables are grown in plots, medicinal plants, dye plants, agricultural grasses, clovers, cereals wild and cultivated, tobacco, hops etc. Bounding this area north and west are wide shrubberies almost entirely filled with Chinese trees and shrubs. Turning left, up the broad grass path between the economic collection and the Oaks, West Walk is reached again; turning right the path is flanked on each side by wide borders, gay in spring with a large collection of Daffodils planted in groups,

also Tulips and Wallflowers. In summer these are succeeded by masses of half-hardy annuals, Dahlias and hardy Chrysanthemums. Half-way along West Walk is Laburnum Walk on the left. Entering this the visitor sees on the left many trees and shrubs belonging to the Pea family (*Leguminosae*), Laburnums, Robinias, Coluteas etc.; and on the right a pergola covered by many species of Clematis and surrounding a collection of Magnolias. Beyond this is a collection of Rosa species, and close by are collections of Prunus (Almonds, Peaches, Cherries, Plums); Pyrus (Wild Apples, Pears, Rowans); Cotoneaster; and further on Rhamnus, Rhus, Viburnum, Lilac (*Syringa*) and the Privet collection. Continuing along Laburnum Walk, bearing to the right in front of the Palm House, Dial Walk is reached, near the top of which is a Sundial. On each side of this walk are the beds of herbaceous plants in families mentioned earlier. All round the Palm House Range, and in front of the Curvilinear Range, are beds about 4 ft. wide, in which will be found an immense variety of shrubs and herbaceous plants requiring some protection. Here also in season will be seen many bulbs: Iris reticulata in spring, Hippeastrum Ackermanni in summer, Crinums, Amaryllis Belladonna and Nerine Bowdeni in autumn. All through the grounds are many groups of new and improved varieties of flowering shrubs, planted for effect. Double and single pink and white Japanese Cherries are a feature in early spring, and these are followed by Japanese and Chinese Wild Crabs, so that there is scarcely a day in the year without flowers in the open as well as in the conservatories.

In the office building there is a fine Library of botanical and horticultural books; a Herbarium of Irish and British plants collected by Dr. D. Moore; the "Augustine Henry" Forestry Herbarium, comprising specimens of a remarkable collection of trees collected by Prof. Henry during his travels and while writing the "Trees of Great Britain and Ireland," in conjunction with the late H. J. Elwes. Specimens of plants growing in the Gardens are constantly being dried and preserved for reference.

LAND RECLAMATION IN THE CONGESTED DISTRICTS.

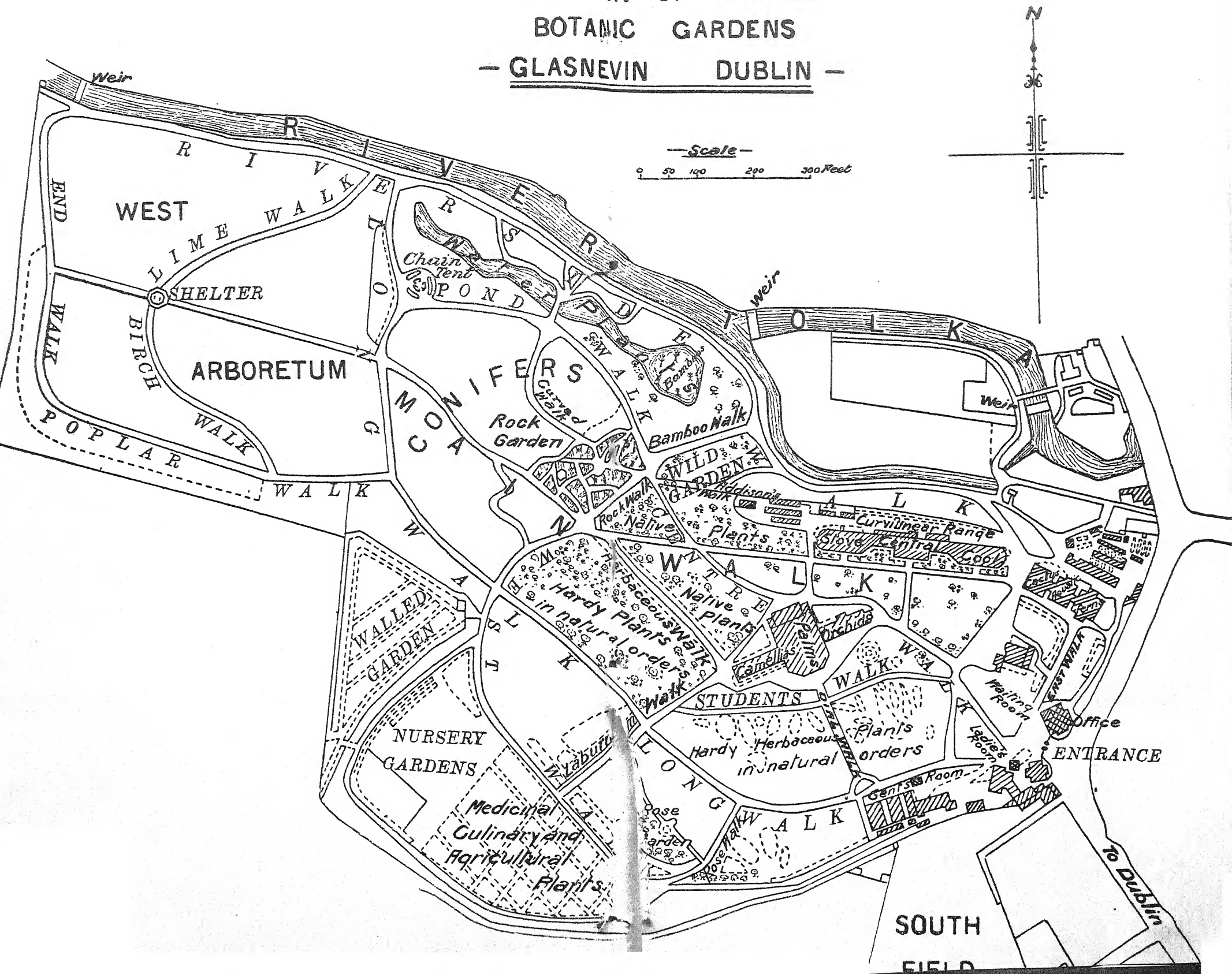
By virtue of the Irish Land Act, 1909, the original Congested Districts area (which more or less corresponded to the present Gaeltacht) was extended so as to comprise the administrative counties of Donegal, Leitrim, Sligo, Mayo, Roscommon, Galway and Kerry ; the Rural Districts of Seariff, Tulla, Kildysart, Kilrush, Ennistymon and Ballyvaughan, situated in County Clare ; and the Rural Districts of Schull, Bantry, Castletownbere and Skibbereen, situated in the western division of County Cork.

Anyone having an intimate knowledge of economic conditions in the Congested Districts realises the immense importance of ensuring that all the arable land therein should be fully and properly utilised. The scarcity of arable land in the area scheduled as " Congested " is a pressing problem, and it was to provide a partial solution of this problem that the Department of Agriculture formulated a scheme to encourage reclamation by individual smallholders. As a preliminary step in this connection the Department carried out a survey, through its local officers, for the purpose of ascertaining the area of waste land in each holding under £15 valuation and the proportion of this land that could be economically reclaimed. As a result of the survey it was found that on 151,123 small holdings in the Congested Districts there are over 300,000 acres of waste land capable of being economically reclaimed. This shows the great amount of useful work that could be done in the direction of land reclamation in the Congested Districts, and the immense economic possibilities there are for work of this nature.

In the summer of 1931 a sum of £750 was made available for an experimental land reclamation scheme in the Congested Districts, and in the following autumn the scheme was put into operation. The provisions of the Scheme were as follows :—

1. The scheme to apply to holdings having a gross annual rateable valuation of not more than £15, and to holdings of migrants and holdings enlarged under the Land Acts. Preference to be given to applicants with holdings of low valuation.
2. The area in respect of which a grant will be paid to be not less than one statute rood or more than two acres, except in very special circumstances.
3. The scheme to apply to all lands that, from the point of view of agricultural production, are now useless, or nearly so, but the reclamation of which, in the opinion of the Department of Agriculture, is a sound economic proposition.
4. All lands in respect of which applications are received to be inspected for the purpose of ascertaining whether the lands come under the scheme, and, if so, to determine the amount of the grant per statute acre to be payable on the satisfactory completion of the work.

— PLAN OF THE —
BOTANIC GARDENS
— GLASNEVIN DUBLIN —



5. Applicants must agree to carry out the work to the satisfaction of the local officer of the Department of Agriculture.
6. The amount of the grant to be one-fourth of the total estimated cost of reclamation, and not less in any case than £1 or more than £5 per statute acre.

The results of the operations in 1931 were so satisfactory that it was decided to continue the scheme during the following year on an increased scale. Each local officer was instructed to work the scheme on fifteen holdings in 1932 as against a maximum of six holdings in the previous year. In the autumn of 1933 the scheme was again worked and on a larger scale than in the previous year.

In consequence of the consistently satisfactory results that were obtained from the scheme from 1931 to 1933 inclusive, a sum of £12,000 was allocated to the Department of Agriculture out of the Vote for the Relief of Unemployment for the financing of the Land Reclamation Scheme during the year 1934-35.

The particulars showing the total expenditure, the number of grantees, and the total area of waste lands brought into reclamation will be found in a table at the end of this article.

The cost of reclamation is carefully estimated in each case by the Assistant Agricultural Overseer on the occasion of his initial inspection of the lands which the applicant proposes to reclaim. The estimates are so conservative that it would be impossible for a contractor to do the specified work at anything like the amount allowed. They are framed on the assumption that a farmer and his sons will work harder on their own farm than if they were employed elsewhere on the basis of a weekly wage.

As the major portion of the lands that have been, and that are likely to be, reclaimed under the scheme consists of cut-away bog, sour marshes, rough mountain bogs and moors, lime must necessarily play an important part in the process of reclamation. In many districts there is a serious scarcity of lime, with the result that wherever supplies are available they are generally sold at prices that prohibit the farmer from purchasing the necessary quantities for land reclamation work. Along the seacoast farmers use sea sand as a substitute for lime with very satisfactory results, and in other areas, where lime is not available, the practice of applying heavy dressings of road scrapings, in lieu of lime, has been found to work quite well.

The Department of Agriculture have given the question of lime supplies for agricultural purposes in needy areas special consideration, with the result that £500 was made available, in 1934, for the erection of limekilns in districts where lime was not produced and where it is badly needed for agricultural purposes. Under the scheme 50 limekilns, each of 300 cubic feet capacity, have been constructed in the most needy areas throughout the Congested Districts. The kilns have been designed for the consumption of turf. Each approved applicant undertaking to erect, at his own cost, within a specified time, a limekiln in accordance with the specification of



Bog Reclaimed and Limed



Reclamation Plot at Lackaun, June 1933, showing Land before
Reclamation—no Herbage except Short Heather

the Department of Agriculture, is paid a cash grant not exceeding £10 as soon as the kiln is completed to the satisfaction of the Department. In consideration of the grant, the kiln-owner must also undertake :—

1. To use and preserve the kiln for the burning of lime ;
2. To sell the burned lime to neighbouring farmers at a price per barrel (of 5 cubic feet) to be fixed by the Department of Agriculture ;
3. To maintain the kiln in good order and condition for a period of five years.

A cross-section and specification of the Congested Districts limekiln are reproduced at the end of this article.

In every instance in which a land reclamation grant is paid, tillage of the plot is insisted upon, and the manuring and seeding of the reclaimed area is done under the supervision of the Assistant Agricultural Overseer. Whilst there is no definite system of cropping the reclaimed plots, the general practice is to plant potatoes the first year, but, if the land is very rough, potatoes are planted in the plots two years in succession in order to get the soil properly broken up. A grain crop, generally oats, succeeds potatoes, and then the land is laid down to grass for a few years.

Whilst the scheme provides that grants may be earned by farmers with gross annual rateable valuations not exceeding £15, preference is given to applicants of the lowest valuations. This arrangement was found to be necessary because of the fact that the number of eligible applicants is now greatly in excess of the available funds. A careful examination of the records discloses the fact that the vast majority of the grantees are smallholders with annual rateable valuations of less than £7. The scheme is, therefore, worked so as to provide relief for the needy and deserving smallholders to the fullest possible extent. The main benefits of the scheme may be summarised as follows :—

1. Productive employment is provided for the needy smallholders and their sons at a time of the year when they would otherwise have little or nothing to do on their farms ;
2. The scheme operates in the parts of the country where there is a teeming population of young men and a scarcity of local employment ;
3. The money earned by way of the grants-in-aid is usually paid about the middle of March, when small farmers are very often in need of ready cash for the purchase of seeds and manures ;
4. The distribution of public funds through the medium of the Land Reclamation Scheme ensures that relief is provided for a great number of needy people ;
5. Because of the expert supervision under which the scheme is worked, satisfactory crops are produced on the reclaimed plots even in the first year ;

6. The area of reclaimed land, although in itself small, frequently means an addition of 50 per cent. or more to the cultivable land on the individual small holding. Thus the scheme provides a partial solution for the relief of congestion by increasing the area of arable land.

Scheme of Grants for the Erection of Limekilns in Congested Districts.

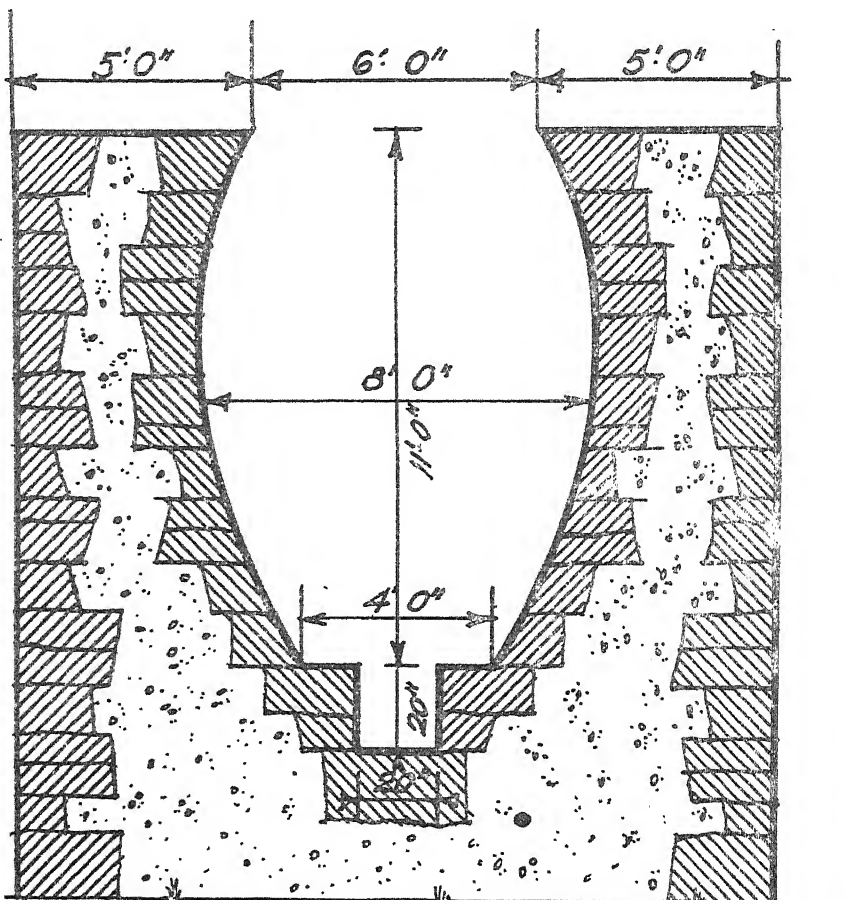
Cross-Section Drawing of Kiln.

SPECIFICATION.

The kiln to be of the dimensions specified in the drawing below and to be lined and faced with suitable stone. Granite is not suitable for this purpose and should not be used. The layer of masonry forming the lining of the kiln is to be neatly built with stones of good depth (15 to 18 inches) so as to ensure that the lining will last for the longest possible length of time. The facing of the kiln is to be a well-built stone and mortar structure. The internal packing of the kiln is to be done with well-worked yellow clay daub. The interior surface of the kiln should be kept lined as required with well-worked yellow clay daub so as to preserve the stone lining and prevent percolation of air through the wall of the kiln.

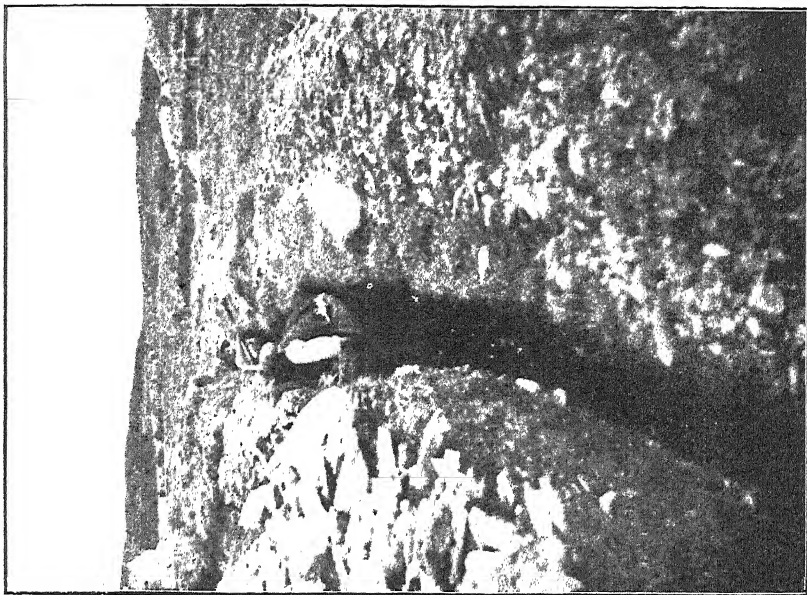
JOHN KELLY.

Cross-Section Drawing.





Liming a Reclamation Plot at Annagh



Making of Drains on Reclamation Plot at Liscarney, Westport

TABLE I.

Total area reclaimed and total amount of Grants earned in each County during each of the years 1931/32, 1932/33, 1933/34, and 1934/35.

1931/32					Total area reclaimed (Statute)			Total amount of grants earned		
COUNTY					A.	R.	P.	£	s.	d.
Donegal	..	..	..	..	26	1	15	111	6	1
Sligo	..	..	..	..	6	1	25	31	7	4
Leitrim	..	..	..	..	9	2	18	43	5	0
Roscommon	..	..	..	..	8	2	22	39	11	3
Mayo	..	..	..	..	22	1	20	95	3	6
Galway	..	..	..	..	59	1	16	243	7	11
Clare	..	..	..	..	15	2	4	67	15	5
Kerry	..	..	..	..	17	1	15	75	2	2
West Cork	..	..	..	..	9	0	25	43	1	4
TOTALS ..					175	0	0	750	0	0

1932/33					Total area reclaimed (Statute)			Total amount of grants earned		
Donegal	..	..	..	..	278	2	4	1,310	9	3
Sligo	..	..	..	..	64	3	5	293	3	4
Leitrim	..	..	..	..	88	0	7	477	8	2
Roscommon	..	..	..	..	80	0	7	337	13	11
Mayo	..	..	..	..	264	3	5	1,266	3	8
Galway	..	..	..	..	699	0	36	2,868	11	3
Clare	..	..	..	..	157	0	37	686	19	7
Kerry	..	..	..	..	176	1	10	703	7	10
West Cork	..	..	..	..	109	0	25	313	12	4
TOTALS ..					1,918	0	16	8,277	9	4

1933/34					Total area reclaimed (Statute)			Total amount of grants earned		
Donegal	..	..	..	..	430	0	21	1,930	15	5
Sligo	..	..	..	..	95	3	27	410	14	1
Leitrim	..	..	..	..	213	2	19	1,020	7	10
Roscommon	..	..	..	..	65	1	21	310	17	2
Mayo	..	..	..	..	542	0	13	2,442	7	6
Galway	..	..	..	..	855	0	37	3,572	14	4
Clare	..	..	..	..	199	1	13	892	4	6
Kerry	..	..	..	..	246	3	37	939	14	10
West Cork	..	..	..	..	176	3	20	603	16	1
TOTALS ..					2,825	2	8	12,123	11	9

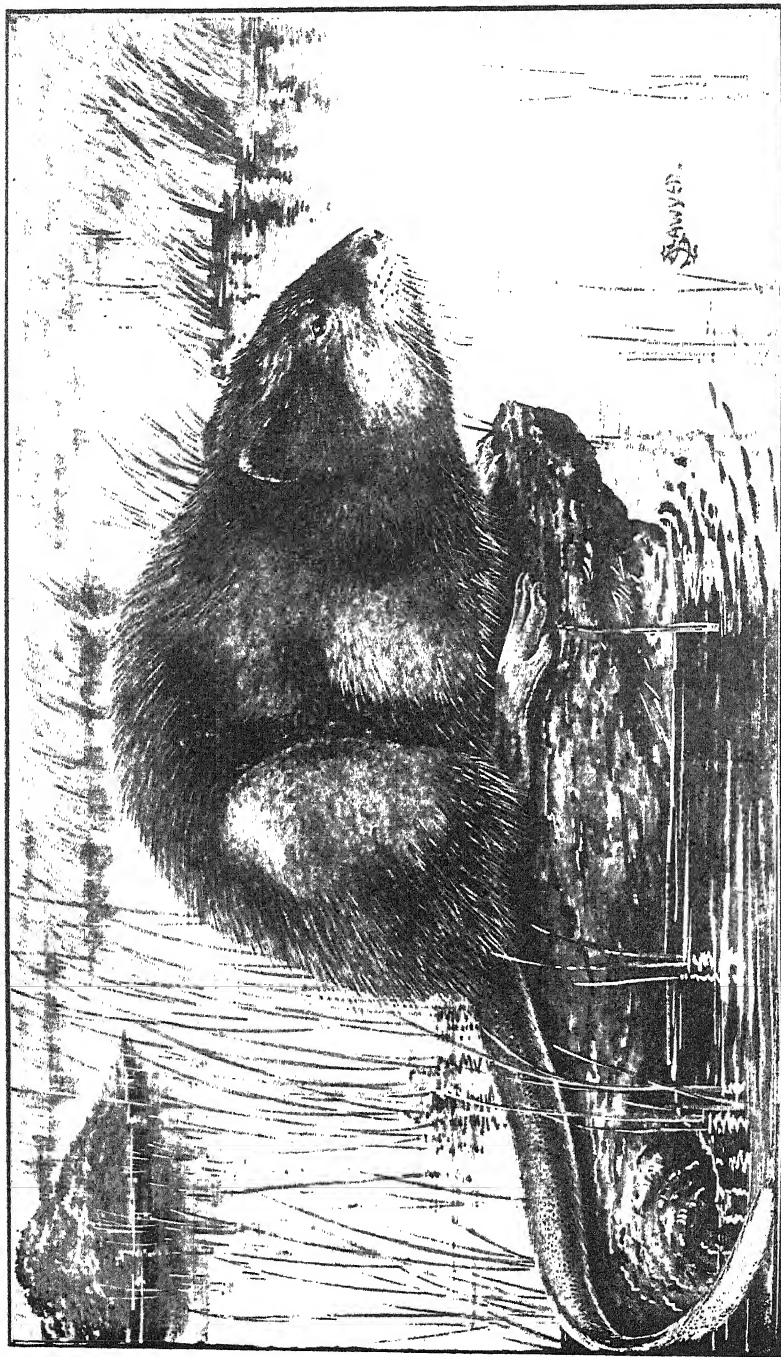
1934/35					Total area reclaimed (Statute)			Total amount of grants earned		
*N. West Cavan	..	..	..	..	23	2	27	117	3	0
Donegal	..	..	..	..	354	1	36	1,608	9	6
Sligo	..	..	..	..	115	0	7	521	2	11
Leitrim	..	..	..	..	166	3	16	799	6	1
Roscommon	..	..	..	..	75	0	0	343	10	0
Mayo	..	..	..	..	446	3	19	2,140	3	9
Galway	..	..	..	..	725	2	9	3,090	3	5
Clare	..	..	..	..	187	1	34	850	17	1
Kerry	..	..	..	..	166	2	20	661	17	1
West Cork	..	..	..	..	221	0	0	790	14	2
TOTALS ..					2,482	2	8	10,923	7	0

* For 1934-35 it was decided that the scheme should be specially extended to an area in North West Cavan where conditions are similar to those prevailing in the adjoining county of Leitrim.

TABLE II.

Total number of Grantees, total area reclaimed, total amount of grants earned, average amount of grant per statute acre, average area reclaimed by each grantee and average amount of grant earned by each grantee during each of the years 1931/32, 1932/33, 1933/34 and 1934/35.

Year	No. of Grantees	Total area reclaimed (statute)	Total amount of grants earned	Average amount of grant per acre (to nearest penny)	Average Area reclaimed per Grantee (to nearest perch)	Average amount of grant earned by each Grantee (to nearest penny)
		A. R. P.	£ s. d.	£ s. d.	A. R. P.	£ s. d.
1931-32	200	175 0 0	750 0 0	4 5 9	0 2 25	2 16 5
1932-33	2,973	1,912 0 10	8,277 9 4	4 6 9	0 3 9	3 9 9
1933-34	4,083	2,825 2 8	12,723 11 9	4 5 10	0 2 31	2 19 5
1934-35	3,886	2,482 2 8	16,923 7 0	4 8 2	0 2 22	2 16 4
Totals ..	10,608	7,491 0 32	22,074 8 1	—	—	—
Averages ..	—	—	—	4 6 9	0 2 31	3 0 6



[By courtesy of the United States Department of Agriculture.

THE MUSKRAT

THE MUSKRAT IN SAORSTÁT ÉIREANN.

The muskrat is a rodent which, when full grown, is about four times as large as the ordinary brown rat. Its total length is about 22 inches, the head and body measuring $13\frac{1}{2}$ inches and the tail $8\frac{1}{2}$ inches. It has a broad head, blunt muzzle, small eyes, short ears nearly invisible in fur, a short and hardly noticeable neck, and a stout body clothed with dense fur. The normal colouring is a darkish brown more intensive on the back and lighter on the underpart. The long tail is compressed laterally and is scaly and thinly haired. The legs are short, especially the front ones, and the feet are short and provided with rather long claws. The hind feet are slightly webbed, with conspicuous fringes of stiff white hairs, and are so formed that they can be turned edgewise when carried forward while the animal is swimming. A gland common to both sexes contains a secretion with a musk-like scent from which the animal derives its name. Musquash is the Cree Indian name and has the authority of long use, especially among fur dealers.

Until early in the present century the muskrat was not to be found outside North America and Canada, where in the commerce of furs there is no fur bearer of more importance. In certain states in America the trapping of the muskrat is prohibited from May 1st to November 1st of each year. The earliest legislation for the protection of the muskrat was the Massachusetts law of 1791, which prohibited trapping during the months of June, July, August and September. At present this animal has partial protection in a large part of its range throughout North America, but most of the laws are of comparatively recent enactment.

Compared with most other furs of such small size, muskrat furs are of excellent quality and durability; their cheapness is chiefly due to their abundance. The earliest demand for the fur was for the manufacture of so-called beaver hats. Properly dyed and made up, these hats are difficult to distinguish from genuine beaver fur. Modern fur-dressers and dyers sometimes use the fur of the muskrat to imitate many of the most costly furs, and have thus created a continuous demand for muskrat pelts. Some eighteen operations are said to be required to convert the raw pelt into the finished product and many of these operations are complicated and highly technical. In the making of a musquash coat as many as two hundred, or even three hundred, skins may be sorted and matched to obtain the selection of pelts required.

The growth of the demand for muskrat furs is shown by the records of London importations and sales. From 1763 to 1800 (38 years) the average number of skins imported and sold annually in that market was less than 75,000. During the 50 years from 1801 to 1850 the average was about 411,000. From 1850 to 1900 inclusive, the importations averaged over 2,534,000 yearly. During the ten years, 1900 to 1910, the average rose to 4,223,000, and for the five years 1910 to 1915 the average was still higher

at £215,518. From 1915 onwards, owing to the European War, and in recent years to the decline in the value of furs, the importations have decreased. Notwithstanding the fact that during the past century and a half over a quarter of a billion muskrats have been taken for their pelts, the supply has not diminished greatly. It is probable that, with adequate protection in the breeding season, from ten to twelve million pelts could be taken annually in North America without unduly depleting the supply.

The prices paid for muskrat skins vary considerably from year to year. Early in the present century the average price was about 1/9 each. In 1919 skins of first class quality brought as high as 21/- each in the London fur markets, in 1920 the highest price was 18/- each, in 1921 16/6 each; and in 1922 9/- each. To-day the highest price is about 5/- each.

EUROPE.

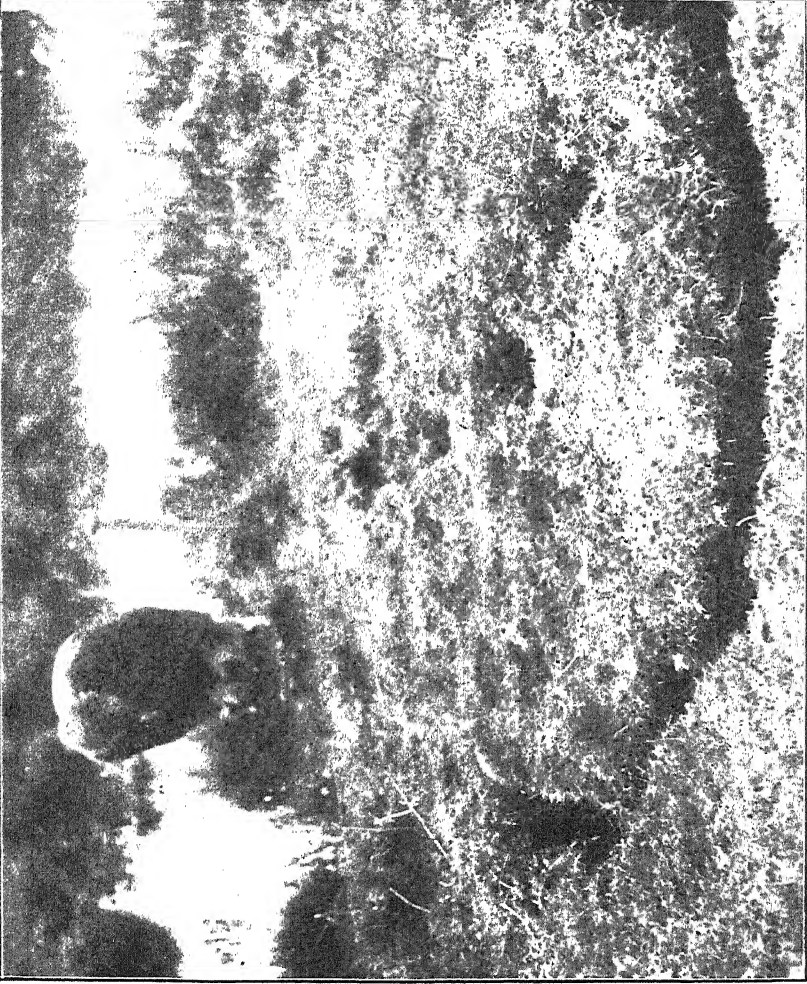
From the records available, it would appear that the muskrat was first introduced into Europe in 1906, when five of them were brought from Canada to an estate near Prague. They multiplied rapidly and it is estimated that there are over 10,000,000 muskrats now in Central Europe. Neither in size of body nor in the quality of fur does the European muskrat equal its Canadian ancestors.

In Czechoslovakia and in portions of Germany muskrats have caused considerable damage to property. Strenuous efforts have been made to combat them, particularly in Germany.

ENGLAND AND WALES.

In the winter of 1931-32, the muskrat menace first manifested itself in the Severn valley in Shropshire, and on investigation it was found that in October 1929, with the object of starting fur farming, a local landowner imported 120 muskrats from North Rice Lake district, Ontario, Canada, and put them into a specially prepared pool of about 60 acres at Shrawardine near Shrewsbury. The animals were allowed to breed unmolested until the winter of 1931-32, when 870 were trapped, and it was found that, not alone had the average weight increased as compared with their ancestors, but also that the quality of the fur had improved. While trapping operations were in progress it was ascertained that muskrats were escaping, definite traces of their presence being noticeable on the river Severn, which flows only about a mile distant from the farm. In the winter of 1932, it transpired that in addition to those kept near Shrewsbury, muskrats were being kept at about 50 other centres in England and Wales, but mostly in very small numbers. In March 1932, an Act was passed prohibiting the importation of muskrats into Great Britain, and also the keeping of muskrats, except under licence.

In May 1932 the depredations of the muskrat in the Severn Valley, and also on the banks of the rivers Vyrnwy and Perry, were so serious that



Chain of Burrows showing Injury to Land.

the keeping of muskrats by private individuals even under licence was prohibited by law. A campaign for the destruction of the pest was launched, and by the end of June 1933, 3,181 muskrats had been killed in Shropshire and Montgomeryshire.

SCOTLAND.

The muskrat was first introduced into Scotland in 1929, when six pairs imported from Canada were installed in a field near Feddal, close to Braco, in Perthshire. Five pairs soon escaped, but later a male was found dead, so that the stock from which the Scottish infestation originated was five females and four males. During the three years up to January, 1934, 890 muskrats had been killed, all descendants of the few that escaped in 1929.

SAORSTÁT ÉIREANN.

The muskrat was introduced into Saorstát Éireann in 1927 when a landowner, residing near Nenagh, Co. Tipperary, imported one pair from Ontario, Canada, with the object of starting fur farming on the pen-raising method. The muskrats soon bit through the wire netting and escaped into the Nenagh river, close by. Nothing further appears to have been heard of them until January 1933, when a specimen was shot at Dromineer, about three miles from where the rats escaped. Official investigation then revealed that muskrats were numerous on the Nenagh river and on the shores of Lough Derg.

Legislation was quickly enacted under which the importation of muskrats into Saorstát Éireann and the keeping of them was prohibited. Methods of control as practised in other countries, where the animal has become a menace, were studied, and through the courtesy of the Ministry of Agriculture and Fisheries in England, the writer was enabled to obtain first hand knowledge of the campaign being waged in Shropshire by officials of the Ministry for the extermination of the pest.

The Irish campaign against the Muskrat was commenced in the Nenagh district in September, 1933, and during the first nine weeks of its progress the average catch amounted to 30 muskrats per week. An area of approximately 150 square miles was found to be infested, but because of the very dry weather during the previous six months, which caused the drying up of the small streams and dykes, it was found that the majority of the muskrats had forsaken their haunts in these and had moved into the Nenagh and other rivers and also to the numerous small lakes and ponds throughout North Tipperary, where they found a sufficient supply of suitable aquatic plants for food, and water deep enough to cover the entrances to their burrows. The continuance of the dry weather to the end of 1933 facilitated the work of trapping, as, in the absence of floods, the autumn and early winter migration of the muskrats was restricted. Even the intensive trapping campaign which was being pursued in their established haunts during the months of October and November does not appear to have forced them to migrate in any appreciable numbers. Proof of this is established by the small number of muskrats taken in the various "ditch

traps," set along the rivers flowing from the infested areas. Since the commencement of the campaign 487 muskrats have been killed in Counties Clare and Tipperary by official trappers.

DESTRUCTIVE HABITS.

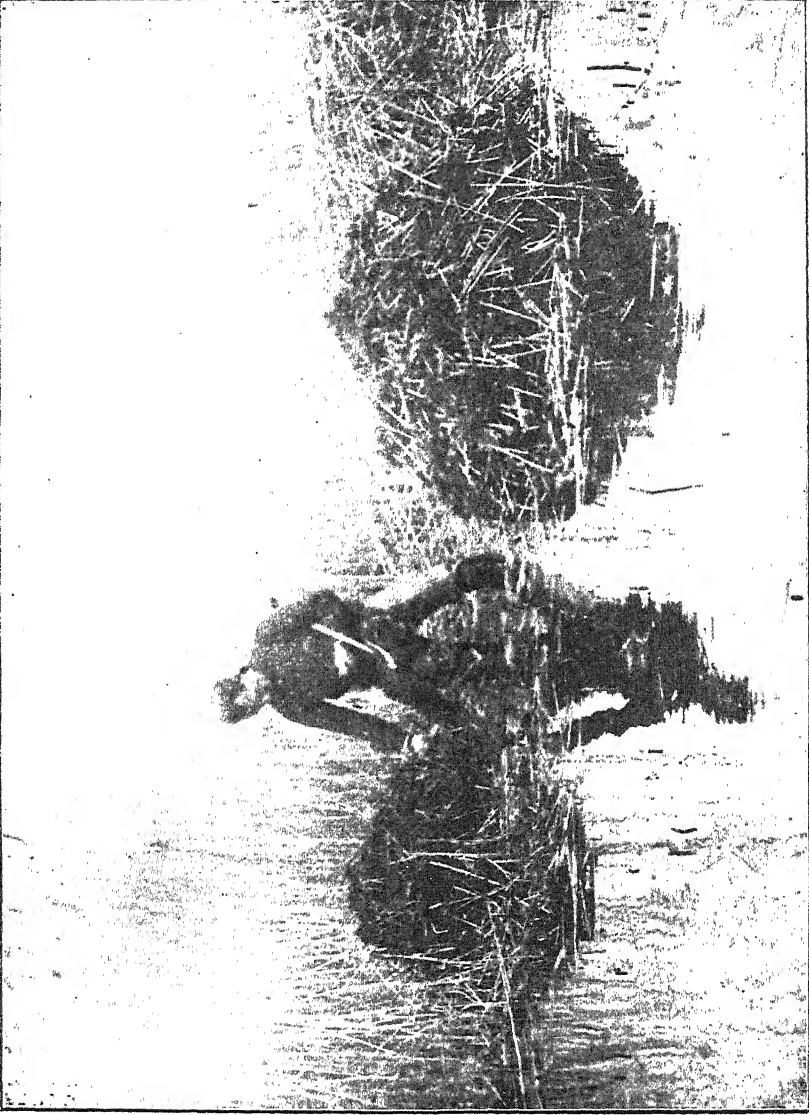
Where muskrats are abundant they do considerable damage to embankments, rivers, banks etc., by piercing them with their burrows and liberating the water. Their introduction into this country being of comparatively recent origin, not much overt evidence of their destructive powers is available. The most serious damage has been the injury to river banks, large sections of which have collapsed as a result of being undermined by muskrat burrows. The collapsed portions have frequently impeded the proper flow of water and caused flooding of adjacent land, while drainage has often been seriously obstructed, as infested streams and drains tend to lose their well-defined channels and to be dispersed through the adjoining fields. Good pasture and meadow land is thus converted into useless swamp. Burrows traversing pasture land just under the surface collapse when trodden upon and form dangerous pitfalls for man and beast. In Europe, and especially in Germany, experience has clearly demonstrated the widespread damage that may result if once the animals are allowed to establish themselves. Instances of the destruction of railway embankments, banks of canals and mill dams in districts where manufacturers depend on water power, are not rare.

REPRODUCTION.

The muskrat is a very prolific breeder. In this country the breeding season, owing to favourable climatic conditions and abundance of food, is longer than in most other countries. Evidence is available of litters having been born as early as the middle of March, and as late in the season as October. Authorities differ as to the length of the period of gestation and it has been variously estimated at from twenty to thirty days. Climatic conditions, which are stated to affect the breeding habits of the muskrat, may account for the difference in time. The young are born with a fine silky pelage which grows darker and heavier by the time their eyes are open, which is usually in about thirteen days.

HOUSING.

For the most part, in this country, muskrats make their abode in burrows. In marshy localities where conditions are unsuitable for burrows but with abundance of aquatic plants, they sometimes build "lodges" which they occupy in the winter months. In a quiet location on the bank of a river, pond, dam or dyke, the muskrat constructs its burrow, which usually extends upwards into the bank above the level of the water. The burrows often rise to within a few inches of the surface of the ground and are frequently protected above by roots, by trees and shrubs, or by thickly matted turf. They may extend from 10 to 80 feet into the bank and terminate in a roomy chamber which sometimes contains a bulky nest, composed of dried



Muskrat Lodges.

vegetation. Usually three tunnels lead from the nest to the water, and often a tunnel has two branches or outlets. In order to protect itself and family as far as possible from the dangers of floods, the muskrat constructs, on the banks of such waters as change their level suddenly, tiers of burrows or systems of superimposed galleries, which are all connected one with the other. In flat banks, before the main burrows and below the water level, are often to be found trough-shaped channels, these being the actual entrances and exits, which in clear water, and on banks which are not very much overgrown, enable the presence of the muskrat to be very easily perceived, especially as the animal frequently loses at the entrance the freshly bitten-off pieces of aquatic plant which it drags into the burrow for lining the passages or for food. Such fragments of plants are frequently seen protruding from the entrance.

Muskrat "lodges" are composed of rushes, reeds, iris roots and other aquatic plants mixed with mud etc. The "ingredients" depend on the flora available, but are mainly of the kind of plants on which the animals feed. These are heaped up in fairly orderly arrangement until the domelike top rises three or four feet above the water. Within the part of the lodge above the water a chamber is formed, from which two or three passages lead downwards, through the mass, into the water. If the water is shallow, the animals excavate deeper channels leading from the lodge to various parts of the pond or other water on which the lodge is built. The lodges are mostly used for winter shelter and as a store-room for food during the cold period of the year when there is very little vegetation.

In the winter, during frost or bad weather, the muskrats show a tendency to lie up in their burrows and to await the return of better conditions. Intensive trapping in a particular locality over a long period induces a similar habit, especially in animals that have been trapped and have succeeded in escaping from the trap.

MIGRATION.

Besides the enforced migration due to the drying up of their habitat, such as occurred in Co. Tipperary in the summer of 1933, muskrats often traverse long distances in late autumn and early spring. The causes are not understood, although the spring movement has generally been attributed to the mating season. Experiments made in Bavaria showed that a muskrat could travel upwards of 85 miles against a strong current and dig its burrows in the new home all in the space of 15 days. Streams, canals and ditches are the great highways, but the muskrats occasionally travel over dry land and along roads. When met with away from water the animals sometimes show considerable ferocity and have been known to attack human beings savagely without apparent provocation.

During the autumn and spring migration periods the principal outlets by water from the infested area in Co. Tipperary were set with "ditch traps," and the trapping results indicate that the number of muskrats which migrated, or attempted to migrate, was very small, and fully nine-tenths of these were males.

FOOD.

Musk rats are in the main vegetable feeders, though doubtless, like many rodents, they will eat flesh or fish if driven to it by hunger. In winter they feed on the roots of wild iris, water-lilies and rushes, the white portion of bulrushes and almost all other aquatic growths of their natural habitat. In summer, in addition to the above-mentioned foods, they eat many annuals which grow in damp places or on the banks of ponds, ditches and streams.

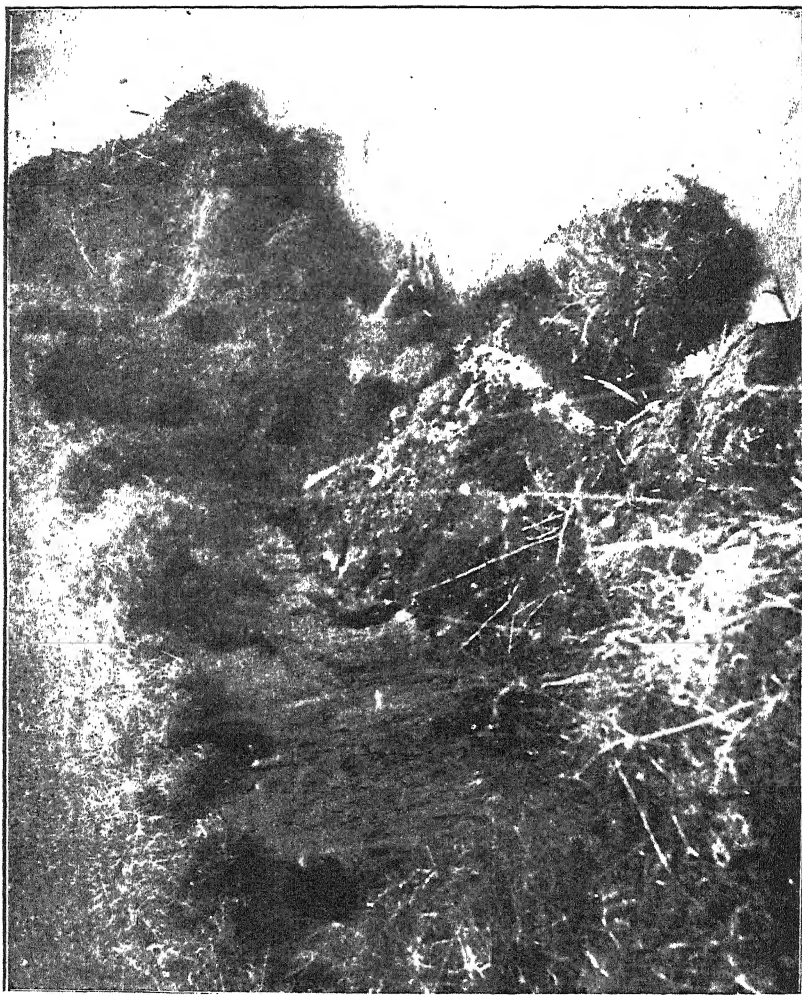
ENEMIES OF THE MUSKRAT.

Man is by no means the only destroyer of the muskrat. Among its natural enemies in this country are the stoat, brown rat, pike, fox, hawk and owl. Being blind until two weeks old, young muskrats fall an easy prey to the brown rat and the stoat, which invade the muskrat burrows and destroy them in the nest. The brown rat considers the muskrat a dainty morsel, as not alone does he slaughter and devour the young, but frequently trappers, when going the rounds of their traps in the early morning, have found that the carcasses of trapped adult muskrats have been almost completely eaten by brown rats. It is practically certain therefore, that the brown rat, and to a lesser extent the stoat, have, to an appreciable extent, been responsible for keeping down the muskrat population in this country.

TRAPS AND TRAPPING.

Various types of steel traps have been used in this country and almost all of them with a certain measure of success. The important points when using traps for the purpose of catching muskrats are their setting and the selection of the sites on which to lay them. The manner of setting depends on the particular situation, and the skill of the trapper is best displayed in selecting this. Faulty setting results in the muskrat springing the trap and escaping or being caught in such a manner that he gets away, leaving a limb or part of it in the trap.

Various trapping devices have been employed to outwit the muskrat. One which has proved very effective is the "ditch trap" which is used on ditches, drains etc. It consists of a platform attached to which are four cylindrical leads made of block tin; these leads guide the muskrat to the platform, on which steel traps are placed. The floating island is another successful device. A long plank 6 to 9 inches wide or a floating log may be used advantageously as a support for traps. The plank is moored to the shore by a wire passed through a staple driven into one end and the other end is anchored in the lake, pond or stream. Light cleats are nailed to the upper side at intervals, with space enough between to hold a trap when set. Shallow notches wide enough to hold the traps may be cut into the log, and the traps covered lightly with fine leaves or weed found growing in the water. The ring at the end of each trap is fastened to the plank. The muskrats use these devices as a highway to reach the shore or as a rest, and an animal venturing upon them is almost sure to be caught.



Muskrat Holes and Collapsed Banks—River at Summer Level.

RESULTS OF THE CAMPAIGN.

Experience in other European countries, especially in Germany, where measures of control have been in operation for a considerable number of years, indicated the great difficulty of limiting the area of infestation, once the muskrat had been well established.

Having regard to the factors which appeared to influence the animal in the selection of its habitat in other countries, Saorstát Éireann, with its numerous lakes, rivers, ponds and bogs, apparently provided ideal ground for muskrat propagation, and consequently, at the inception of the campaign, the danger of widespread infestation was imminent. The dry summer of 1933, however, seemed to check propagation, and the continuation to the end of that year of weather conditions favourable to trapping enabled rapid progress to be made with the work of extermination.

Intensive surveying over a wide area and close study of the movements and habits of the muskrat resulted in the full extent of the menace being ascertained. Trapping in various forms was vigorously pursued, with the result that before the commencement of the mating season in the spring of 1934, the weekly trapping returns began to decrease. In May of that year, following the gradual decline in the returns, the point was reached when no further muskrats were caught.

Survey and trapping operations have since been carried out over a wide area, including the originally infested district, but no muskrats have been caught nor has any fresh trace of their presence been found.

Surveying is still being continued, but the campaign may now be regarded as having been brought to a successful conclusion.

The successful prosecution of the campaign is in no small measure due to the goodwill of the farmers and landowners on whose land surveying and trapping were carried out, and to the co-operation of local public officials, the Gardai and the public in general.

THOMAS GARVEY.

FIELD EXPERIMENTS, 1934.

The following report deals with Field Experiments conducted in 1934, which comprised trials with varieties of wheat and oats, and manurial tests on wheat and pasture.

The detailed reports in respect of the trials conducted by the Agricultural Instructors may be found in the Annual Reports issued by the County Committees of Agriculture, and persons who are interested may obtain a copy of the Report for any particular county by applying to the Secretary of the Committee of Agriculture.

WHEAT.

Trials with both winter and spring varieties, together with experiments designed to measure the value of applications of artificial manure to wheat grown on different types of soil, were conducted by the Agricultural Instructors during 1934.

Variety Trials.

In the trials with winter varieties, which were conducted at 74 centres, Queen Wilhelmina, Iron Master and Yeoman II were included in all cases. In addition, Squarehead Master, the inclusion of which was left to the discretion of the Instructors, was sown at 41 centres. The seed of the first three varieties mentioned above was produced at the Albert Agricultural College, Glasnevin. Supplies of seed of Squarehead Master were purchased by the Instructors from reliable seedsmen.

The experiments at practically all centres were laid down under favourable conditions during the period October—November. The rainfall during the autumn and early winter of 1933 was much below normal, with the result that the soil was exceptionally dry at the time of sowing. All varieties germinated uniformly and withstood winter conditions well. The growing season as a whole was unusually dry, with the result that the crops ripened early and there was little or no lodging. The varieties did not ripen in the same order at all centres, but, in general, Iron Master was a few days later in ripening than any of the other varieties included in the trials.

Detailed particulars in respect of these experiments and of the results obtained are set out in Table I.

TABLE I.
WINTER WHEAT VARIETY TRIALS, 1934.

County	Date of Sowing	Character of Soil	YIELDS PER STATUTE ACRE								
			QUEEN WILHELMINA		IRON MASTER		YEOMAN II.		SQUAREHEAD MASTER		
			Grain	Straw	Grain	Straw	Grain	Straw	Grain	Straw	
			c. q.	cwt.	c. q.	cwt.	c. q.	cwt.	c. q.	cwt.	
Carlow	31/10/33	Stiff clay soil	19 2	39	19 0	37	21 2	38	—	—	
"	31/1/34	Medium loam	22 2	41	19 3	39	20 3	38	—	—	
Cavan	10/10/33	—	28 1	35	30 1	40	20 1	38	24 1	36	
"	24/10/33	—	20 1	40	32 0	45	27 2	36	16 0	38	
Clare	—	Good loam	32 0	56	31 2	58	25 3	48	—	—	
"	—	"	25 0	—	26 2	—	23 2	—	—	—	
"	—	"	32 3	56	32 0	55	32 0	57	—	—	
"	—	"	37 0	61	30 0	52	32 3	57	—	—	
Cork	3/11/33	Limestone	31 1	64	26 3	68	25 3	52	—	—	
"	10/11/33	—	23 2	48	22 2	45	18 2	35	18 2	37	
"	—/11/33	Lea ground	14 2	24	15 0	18	17 0	27	13 2	22	
"	11/11/33	Good friable loam	26 1	35	24 2	36	21 2	34	18 1	32	
"	25/10/33	Sandstone loam	24 0	39	17 1	48	21 3	43	14 1	37	
"	8/11/33	Peaty loam	17 2	26	15 0	22	5 3	12	13 2	21	
"	7/11/33	Limestone loam	20 1	41	18 3	36	17 1	32	24 0	34	
"	6/12/33	Light loam	25 2	42	23 2	41	21 3	40	20 1	39	
"	—/11/33	Sandy loam	26 0	48	16 1	38	18 2	27	19 2	30	
"	—/12/33	Medium loam	20 1	38	13 2	33	13 1	36	15 3	35	
"	30/10/33	Deep rich loam	22 1	35	26 0	39	26 3	43	—	—	
"	31/10/33	"	31 0	40	29 1	41	21 0	31	—	—	
Donegal	26/10/33	Clay loam	24 2	46	25 3	42	19 1	34	22 2	40	
Dublin	10/11/33	Stiff clay	28 3	31	27 2	34	24 2	29	—	—	
"	2/11/33	Clay	35 1	41	33 3	51	33 2	52	—	—	
"	4/12/33	"	26 3	38	27 3	34	28 2	37	—	—	
Galway	—/11/33	—	18 0	36	17 0	36	17 2	35	—	—	
"	13/11/33	Limestone loam	21 2	34	22 0	35	19 1	29	—	—	
"	20/10/33	Clay loam	22 2	34	21 2	33	20 0	28	—	—	
Kerry	26/10/33	Light loam	32 2	58	29 1	50	27 0	57	27 0	55	
"	8/11/34	Medium loam	25 2	47	22 0	49	24 3	49	—	—	
"	3/11/33	Light loam	17 2	24	18 1	26	19 2	28	17 3	25	
Kildare	30/11/33	Rich loam	31 0	46	28 2	40	26 2	37	27 2	47	
"	27/10/33	Clay loam	23 1	42	23 0	46	21 3	36	23 2	43	
Kilkenny	—/11/33	Clay loam	40 0	48	40 2	51	33 2	40	—	—	
"	—/10/33	Light loam	24 2	36	27 1	38	18 1	36	19 2	36	
"	—/11/33	Medium loam	34 1	44	32 3	43	25 2	48	29 2	46	
"	—/11/33	Light loam	19 1	32	19 1	32	18 3	30	19 0	32	
Laoighis	20/10/33	Heavy loam	27 2	—	31 2	—	24 0	—	—	—	
"	7/11/33	Light loam	29 0	—	26 2	—	23 3	—	—	—	
Leitrim	24/10/33	Clay loam	27 3	42	25 3	46	26 0	41	—	—	
"	26/10/33	Clay	21 3	37	22 2	39	20 1	37	—	—	
Limerick	—	—	37 0	42	26 0	32	32 2	34	30 3	36	
"	—	—	33 2	38	34 0	35	28 0	35	33 3	37	
"	17/10/33	Limestone loam	26 0	44	21 0	40	19 0	35	—	—	
"	26/10/33	Clay loam	26 1	43	25 0	40	22 2	35	—	—	
Louth	—/10/33	—	49 2	40	40 0	46	39 1	46	37 2	50	
Longford	—	—	34 0	42	34 1	43	28 2	40	23 1	39	
"	—	—	33 1	46	28 2	45	28 2	41	22 2	45	
"	—	—	34 2	46	27 2	42	27 2	43	24 1	35	
"	—	—	33 0	44	34 2	44	27 0	39	—	—	
Mayo	—	Loamy clay	23 2	—	22 0	—	22 0	—	—	—	
"	—	Deep rich loam	22 0	—	21 2	—	21 0	—	—	—	
"	10/11/33	Deep loam	27 1	42	20 0	37	22 2	38	25 3	41	
"	13/11/33	Clay loam	21 3	39	19 1	36	21 0	39	22 3	40	
Monaghan	15/10/33	Medium loam	30 2	49	34 0	53	23 0	47	26 2	50	
Offaly	—	Medium loam	33 3	39	35 0	43	26 0	34	—	—	
"	—	Light clay loam	27 2	40	29 1	39	25 0	41	—	—	
"	—	Light loam	25 0	38	22 2	37	20 2	34	—	—	
Koscommon	26/10/33	Medium limestone loam	25 2	—	24 0	—	28 0	—	21 0	—	
"	3/11/33	Clay limestone loam	26 2	—	25 3	—	25 1	—	22 0	—	
"	4/11/33	—	24 2	38	20 0	34	19 3	32	24 0	36	
"	23/10/33	—	24 2	38	21 0	36	20 0	33	23 3	38	
Tipperary, N.R.	16/11/33	Damp heavy loam	23 2	28	22 1	25	22 2	25	—	—	
"	11/11/33	Rich clay loam	32 0	31	31 0	28	29 2	28	—	—	
Tipperary, S.R.	10/11/33	Medium clay	24 0	36	24 3	36	26 0	42	22 1	38	
"	15/12/33	"	20 0	44	26 0	44	28 0	48	—	—	
Waterford	—/11/33	Good loam	42 2	—	20 1	—	21 0	—	27 2	—	
"	7/11/33	Typical wheat land in good heart.	26 3	45	27 0	43	20 1	24	19 0	40	
Westmeath	8/11/33	Average heavy loam	31 3	36	28 1	37	26 1	39	32 0	40	
"	15/11/33	Heavy clay	15 1	23	16 3	24	18 2	25	—	—	
Wicklow	25/10/33	Rich loam	25 1	36	27 2	38	26 2	34	26 0	38	
"	15/11/33	Gravelly loam	18 3	30	19 1	32	17 0	27	19 0	33	
"	8/11/33	Rich loam	55 1	40	34 2	42	32 0	37	31 2	38	
Meath	—	Clay loam	30 1	48	30 0	50	32 0	49	33 1	48	
"	—	"	27 0	43	33 0	53	29 0	52	26 0	47	
AVERAGE			27 2 (74 centres)	40 (66 centres)	26 0 (74 centres)	40 (66 centres)	24 0 (74 centres)	38 (66 centres)	24 0 (41 centres)	38 (38 centres)	

Queen Wilhelmina again gave on the average the heaviest yield of grain. This variety, which has been included in these trials each year since 1915, has consistently given better yields than any other variety included in the tests. Iron Master, which is a relatively new variety, came second to Queen Wilhelmina in respect of yield. This is a red wheat with a strong straw of medium strength, a dense ear and a large grain. It has been included in these trials for the past four years and has, on the average, occupied second place to Queen Wilhelmina as regards yield. The yields of Yeoman and Squarehead Master approximated closely to each other, and were below those of the other two varieties.

Tests with three spring-sown varieties of wheat were conducted at 63 centres. The varieties sown were April Red, Red Marvel and Squarehead Master, the first two of which are recognised as typical spring varieties. Squarehead Master is usually classified as a winter variety, but, as it is sown in many districts even as late as the 1st March, it was decided to include it in these tests for purposes of comparison. Seed supplies were obtained from reliable seedsmen and sowing was done mostly during February and March. April Red in nearly all cases ripened first, being about one week earlier than Red Marvel. The latter in turn was fit for harvesting almost 10 days before Squarehead Master. In one case Squarehead Master, although sown about mid-March, did not ripen, and in many other cases the harvesting of this variety was delayed until late in the season. Red Marvel ripened in reasonably good season at all centres, but it is noted that the best results were obtained where it was sown in February. The average yield from centres where sowing took place in February was 22 cwts. per statute acre, whereas that from the centres where sowing was delayed until March was under 20 cwts. This indicates that the best results are likely to be obtained from Red Marvel where it is sown early.

Detailed particulars in respect of these experiments are set out in Table II.

TABLE II.

SPRING WHEAT VARIETY TRIALS, 1934.

Centre	Date of Sowing	RED MARVEL		APRIL RED		SQUAREHEAD MASTER		
		Grain	Straw	Grain	Straw	Grain	Straw	
		c. q.	cwt.	c. q.	cwt.	c. q.	cwt.	
Carlow ...	17/2/34	27 3	46	27 2	47	26 1	44	
" ...	16/3/34	24 2	44	24 3	45	did not	ripen.	
Cavan ...	6/3/34	22 0	32	23 1	34	20 0	27	
Clare ...	20/2/34	17 3	29	17 3	32	20 0	31	
" ...	20/2/34	20 0	36	18 2	38	22 3	40	
Cork, E. ...	14/2/34	23 1	41	23 0	49	22 3	45	
" ...	10/2/34	22 3	42	20 0	43	22 3	40	
Cork, S. ...	9/2/34	13 3	15	16 2	23	13 3	16	
" ...	"	22 3	38	19 3	36	21 3	40	
Cork, M.W. ...	8/2/34	23 1	34	20 1	59	35 0	—	
" ...	—/2/34	32 3	49	27 2	53	30 1	45	
Cork, W. ...	—/2/34	13 2	32	18 2	30	15 0	35	
" ...	—/2/34	14 1	35	14 1	31	15 1	33	
" ...	—/2/34	16 0	33	16 0	34	16 1	38	
" ...	—/2/34	14 0	32	14 0	31	11 1	31	
" ...	—/2/34	12 1	32	9 2	26	11 1	33	
Cork, N. ...	23/2/34	17 2	31	20 2	39	18 0	33	
" ...	27/3/34	19 0	35	23 0	40	13 2	25	
" ...	21/2/34	13 1	20	10 1	16	10 3	15	
Donegal ...	"	16 2	37	16 0	34	14 2	41	
Dublin ...	5/2/34	33 2	36	28 2	49	36 1	44	
Galway, S. ...	—/3/34	14 2	30	12 2	26	14 0	29	
" ...	—/3/34	15 0	31	13 2	27	14 2	30	
Galway, N. ...	16/3/34	17 3	27	16 0	25	16 2	26	
" ...	16/3/34	18 2	30	16 1	22	15 0	25	
Kerry, S. ...	2/2/34	14 2	19	16 2	22	14 1	19	
" N. ...	13/3/34	20 2	47	19 0	50	16 3	52	
Kildare ...	22/3/34	26 3	40	24 1	44	25 0	42	
" ...	13/3/34	24 1	44	21 1	45	23 2	43	
Laoighis ...	19/2/34	18 1	—	19 0	—	18 0	—	
" ...	15/2/34	22 1	—	24 2	—	23 3	—	
" ...	15/2/34	27 3	—	26 1	—	26 3	—	
Leitrim ...	26/2/34	21 2	—	20 1	—	18 2	—	
Limerick ...	—	31 0	36	27 3	31	23 2	32	
" ...	—	22 0	24	18 2	20	18 1	24	
" ...	7/2/34	20 0	38	20 0	42	18 0	34	
" ...	12/2/34	26 1	44	24 2	36	23 0	44	
Longford ...	—	26 2	36	22 1	32	19 0	30	
Louth ...	1/2/34	26 2	—	31 2	—	40 0	—	
" ...	19/2/34	27 0	—	21 0	—	23 2	—	
Mayo ...	12/3/34	21 3	38	21 3	43	19 1	34	
" ...	5/3/34	17 2	35	18 0	36	16 1	35	
" ...	15/3/34	16 0	35	17 1	40	18 1	35	
" ...	4/3/34	17 2	34	17 0	36	18 0	36	
Meath ...	27/2/34	23 1	36	21 1	32	24 1	44	
" ...	26/2/34	20 2	34	22 1	29	21 3	39	
Monaghan ...	26/2/34	27 0	41	22 1	40	29 2	45	
Offaly ...	—	20 3	33	18 3	30	21 1	31	
Roscommon, S. ...	2/3/34	18 1	—	16 3	—	17 2	—	
" ...	12/2/34	19 3	—	18 0	—	21 0	—	
Roscommon ...	—/3/34	20 0	32	18 2	28	21 0	33	
" ...	—/3/34	20 2	34	18 1	32	20 3	39	
Tipperary, N.R. ...	12/3/34	18 0	24	18 0	27	20 2	24	
" ...	13/3/34	15 0	24	13 2	23	19 1	26	
Tipperary, S.R. ...	29/3/34	27 0	48	23 3	40	24 2	46	
" ...	26/3/34	25 2	48	23 0	41	21 0	38	
Westmeath ...	15/2/34	19 1	—	19 2	—	23 0	—	
" ...	23/2/34	24 2	—	23 0	—	17 0	—	
" ...	26/3/34	11 0	—	15 2	—	10 0	—	
Wexford ...	16/3/34	20 1	30	19 0	29	21 1	32	
Wicklow ...	28/2/34	34 1	38	31 2	40	28 2	38	
" ...	9/3/34	21 1	27	20 0	27	18 0	25	
" ...	7/3/34	18 2	30	19 3	28	15 2	25	
AVERAGE ...	—	21 0 (63 centres)	34c. 2q. (52 centres)	19 3 (63 centres)	35 (52 centres)	20 0 (63 centres)	33c. 2q. (51 centres)	

There is but little difference in the average returns from the three varieties. Red Marvel, however, gave a higher yield than Square-head Master, and the average yield of grain from the latter slightly exceeded that produced by April Red.

Manurial Trials.

Up to a few years ago the acreage under wheat in Saorstát Éireann was relatively small and, as the bulk of the crop was sown after potatoes or a manured root crop, there was seldom any need to apply artificial manures. Now, however, that the acreage under wheat has expanded considerably, and that the crop is being grown on a wide variety of soils, it is desirable that definite information as to the most suitable dressings of artificial manures for application to the wheat crop should be available. With this object in view, two series of manurial trials were conducted by the Agricultural Instructors. One set of trials was confined to wheat sown on lea and the other to wheat sown following another corn crop. In the selection of centres, preference was given to the lighter or poorer soils where applications of artificial manures would normally be expected to give good results. In each series of trials there were three plots :—

- I. A control plot to which no artificial manure was applied.
- II. A plot to which a mixture composed of 3 cwt. superphosphate (35%), 2 cwt. kainit (14%) and 1 cwt. of sulphate of Ammonia per statute acre was applied, at the time of sowing, or not later than the end of February.
- III. A plot to which was applied about the end of March or the first week of April a top-dressing of sulphate of Ammonia at the rate of 1 cwt. per statute acre.

Detailed particulars and results obtained in respect of the trials on lea ground and on stubble land are given in Tables III and IV respectively.

TABLE III.

WHEAT MANURIAL TRIALS ON LEA, 1934

Centre	Nature of Soil	Variety	PLOT I.			PLOT II.			PLOT III.		
			Grain		Straw	Grain		Straw	Grain		Straw
Carlow ...	Med. loam ...	Queen Wilhelmina ...	c. 21	q. 0	cwt. 41	c. 29	q. 0	cwt. 45	c. 23	q. 1	cwt. 42
Clare ...	Lea, 6 yrs. ...	" " ...	17	0	28	20	2	34	17	3	29
" " ...	Old lea ...	" " ...	11	2	16	23	0	30	15	3	21
" " ...	Very old lea ...	" " ...	15	3	27	22	0	31	17	3	33
Cork, S. ...	Old lea ...	" " ...	18	2	26	25	2	31	22	1	29
" E. ...	" " ...	" " ...	14	3	38	26	1	57	17	0	39
" N. ...	Heavy loam ...	" " ...	21	2	39	27	0	45	25	0	43
" M. ...	" ———— ...	" " ...	12	2	22	19	0	29	12	3	24
" M. ...	" ———— ...	" " ...	15	3	34	22	1	42	17	3	40
" W. ...	" ———— ...	Red Marvel ...	10	2	21	16	0	35	14	2	28
" W. ...	" ———— ...	Queen Wilhelmina ...	21	1	44	24	0	44	22	0	48
Dublin ...	Deep loam ...	" " ...	17	0	23	20	0	28	18	1	27
Galway ...	Limestone ...	" " ...	12	0	24	15	0	32	14	2	30
" " ...	Good loam ...	Squarehead Master ...	16	1	25	19	2	30	20	1	31
Kerry ...	Light loam ...	Queen Wilhelmina ...	16	3	40	18	0	43	16	0	44
Kildare ...	Clay loam ...	" " ...	13	3	25	19	2	31	18	3	30
Laoighis ...	Loam ...	" " ...	33	3	—	42	3	—	39	3	—
" " ...	" " ...	" " ...	21	2	—	28	2	—	24	0	—
Limerick ...	Stiff limestone ...	Million ...	22	2	40	26	0	54	26	2	52
Mayo ...	Gravelly loam ...	Squarehead Master ...	15	0	27	21	2	34	18	2	31
Meath ...	Clay loam ...	Queen Wilhelmina ...	18	0	—	23	0	—	22	0	—
Offaly ...	Light loam ...	" " ...	14	0	21	20	0	31	17	2	34
Tipperary N.R. ...	Clay loam ...	" " ...	24	0	26	31	2	34	27	0	28
Tipperary S.R. ...	" " ...	" " ...	21	2	36	25	0	44	26	2	42
Waterford ...	Light loam ...	Squarehead Master ...	17	3	—	21	3	—	19	3	—
Westmeath ...	Loam ...	" " ...	20	0	28	37	0	40	22	2	32
Wicklow ...	Med. loam ...	White Stand Up ...	20	1	32	24	3	36	22	1	35
AVERAGE Grain, 27 centres. Straw, 23 centres }	---	Total ...	484	1	683	652	1	869	550	3	792
			17	3	30	24	1	37c. 3q.	20	3	34c. 2q.

TABLE IV.

WHEAT MANURIAL TRIALS ON LIGHT SOIL AFTER ANOTHER
CORN CROP, 1934

Centre	Nature of Soil	Variety	PLOT I.		PLOT II.		PLOT III.	
			Grain	Straw	Grain	Straw	Grain	Straw
Clare	Light loam	—	c. 10	q. 23	cwt. 8	c. 12	q. 37	cwt. 15
Cork, S.	"	—	17	2	36	29	0	51
" E.	"	—	20	0	52	24	0	58
" N.	Loam	Double Stand Up	22	2	41	23	0	54
" W.	"	Red Marvel	10	2	19	18	3	25
" W.	"	Queen Wilhelmina	12	1	36	22	2	40
Dublin	Clay	"	14	1	18	15	2	28
Galway	Med. loam	"	17	3	26	10	2	27
"	"	"	15	2	30	18	3	36
"	"	"	14	0	27	16	0	33
"	Limestone	Squarehead Master	17	3	27	21	3	32
"	Poor limestone	"	13	0	20	17	0	26
"	Loam	"	23	3	40	33	0	58
Kildare	Med. loam	"	27	0	33	30	0	38
Kilkenny	Clay loam	White Stand Up	13	0	48	28	0	60
Limerick	Limestone loam	Squarehead Master	16	0	25	2	40	20
Mavo	Loam	"	17	2	24	28	0	80
Oftaly	Light loam	"	15	1	—	20	1	—
Roscommon	Poor loam	"	16	2	—	22	1	—
Tipperary N.R.	Strong clay	Queen Wilhelmina	26	1	28	34	0	35
Tipperary, S.R.	"	"	22	1	38	26	0	46
Waterford	Poor	"	11	1	—	16	3	—
Westmeath	"	"	14	2	22	16	0	26
Wicklow	"	Squarehead Master	17	2	24	24	1	32
	"	White Stand Up	20	0	33	25	2	36
AVERAGE			17	2	30c.	2q.	22	3
Grain, 25 centres			19	3	35c.	3q.	22	2
Straw, 22 centres			10	2	33c.	3q.	22	2

The results obtained in both series of trials are rather striking, the difference between the average yield of grain on the plots which received a complete dressing of artificial manures and those which received none being over 5 cwt. per statute acre. In no case did the complete dressing of artificial manures fail to give a substantial increase, and at very many centres the increase was remarkable. The average yields from the plots which received a top-dressing of sulphate of Ammonia in both series of trials were well in excess of those from the control plots, and with one or two exceptions the top-dressing of sulphate of Ammonia had the effect of increasing yields. Not only did the manurial dressings increase the yield but they also hastened the ripening of the crop. In some cases the crop on the plots to which the manurial dressings had been applied was ready for cutting five or six days before that on the unmanured plot. In no case did the crop on these plots lodge. The trials were, however, located on the poorer types of soil and, as the season was exceptionally dry, the straw was relatively short and strong.

OATS.

During the season 1934, experiments with oats were confined to white varieties. Two series of trials were conducted :—

- (a) A set of trials in which Victory II and Glasnevin Success III were included, and
- (b) A series of trials with Glasnevin Sonas, Sonas Marvellous and Ardri.

The first series of trials was confined to the medium and lighter soils, whilst the second series was conducted on the heavier types of soils where oats is liable to lodge. The seed of each of the varieties included in the trials was obtained from the Albert Agricultural College, Glasnevin.

Particulars of the centres at which the trials were conducted and of the yields obtained at each centre in both series of trials are set out in Tables V. and VI.

TABLE V.
OAT VARIETY TRIALS, 1934

CENTRE	VICTORY II.			GLASNEVIN SUCCESS III.		
	Grain		Straw	Grain		Straw
	c.	q.	cwt.	c.	q.	cwt.
Carlow ...	19	3	27	19	1	26½
Cavan ...	29	1	30	25	0	31
" ...	28	2	30	31	0	31
Clare ...	25	2	—	28	0	—
" ...	22	0	29	20	2	26
" ...	24	0	33	25	0	35
" ...	27	0	41	20	3	28
Cork, E. ...	26	3	27	25	2	21
" ...	23	2	27½	21	2	19½
Cork, N. ...	25	0	23	20	2	22
" ...	27	0	43	29	1	43
Cork, Mid. ...	27	0	64	33	2	47
" ...	30	2	31	25	2	32
Cork, S. ...	18	3	25	20	0	23
Cork, W. ...	20	2	42	23	2	34
Galway ...	21	2	34	24	2	28
Kerry, S. ...	17	2	25	18	0	26
Kerry, N. ...	29	3	42	28	1	37
Kilkenny ...	21	0	26	18	2	23
Laoighis ...	16	2	24	18	0	20
" ...	23	2	23	25	1	20
Leitrim ...	18	3	—	20	2	—
Longford ...	35	2	43	35	3	41
" ...	24	1	40	25	0	41
Louth ...	20	0	—	22	0	—
" ...	17	0	—	18	2	—
Mayo, E. ...	20	0	36	22	0	38
" ...	21	0	38	24	0	39
Mayo, W. ...	17	0	28	19	1	26
" ...	23	3	38	26	2	38
Offaly ...	18	1	20	19	0	21
" ...	16	2	25	18	0	26½
Sligo ...	23	3	—	27	0	—
Tipperary N.R. ...	21	0	28	23	0	31
" ...	19	1	24	17	3	30
Waterford ...	24	2	30	26	1	25½
Wicklow ...	20	3	30	22	1	29
" ...	18	3	30	18	2	27
AVERAGE Grain, 38 centres Straw, 33 centres	22	3	32	23	1	30

TABLE VI.
OAT VARIETY TRIALS, 1934

CENTRE	GLASNEVIN SONAS			SONAS MARVELLOUS			ARDRI		
	Grain		Straw	Grain		Straw	Grain		Straw
	c.	q.	cwt.	c.	q.	cwt.	c.	q.	cwt.
Dublin ...	29	3	34	34	2	44	35	1	44
" ...	33	2	54	34	1	53½	31	0	53½
Galway ...	29	1	32	22	1	27	25	0	28
" ...	29	0	34	29	2	36	27	3	33
Kildare ...	18	2	27	21	3	32¾	22	1	35½
" ...	9	3	19½	11	3	24¾	12	2	23½
Limerick, W. ...	21	1	32	22	1	27	25	0	28
" ...	29	0	34	29	2	36	27	3	33
Limerick, E. ...	30	0	40	30	0	42	32	0	46
" ...	23	0	42	23	0	45	20	0	42
Meath ...	28	3	44	23	0	42	26	2	41
" ...	32	3	46	30	3	44½	31	0	49
Roscommon, S. ...	24	2	40½	27	1	41	26	0	39
" ...	25	3	39½	25	3	39½	24	1	40½
Roscommon, N. ...	24	2	32	21	0	30	22	3	28
" ...	22	0	30	22	0	28	21	0	28½
Tipperary, S.R. ...	26	2	42	24	2	38	26	3	36
" ...	23	2	32	21	0	28	24	0	30
Westmeath ...	24	0	28	24	0	30	23	1	29
" ...	19	0	26	16	0	24	16	0	23
AVERAGE (20 centres) ...	25	1	35c. 2q.	24	3	35c. 3q.	25	0	35c. 2q.

In the first series of trials Glasnevin Success III produced on the average a better yield of grain than Victory II, thus confirming the results previously obtained in similar trials with these varieties. At all centres, with one exception, the two varieties stood up well and produced grain of good quality. In general, Glasnevin Success III produced a shorter straw than Victory II, and at nearly all centres it ripened five or six days earlier than the latter.

In the other series of trials, which were conducted at 20 centres in eight counties, the average yields from all three varieties were practically equal. Moreover, all three varieties resisted lodging remarkably well. The dry season was not, however, conducive to a heavy crop of straw.

Glasnevin Sonas, which has been fully described in previous reports, has been included in these trials over a number of years and has consistently given good results. Moreover, it produces a stiff straw which resists lodging well. Sonas Marvellous is a variety of the same type as Glasnevin Sonas and, like it, resists lodging to a high degree. It is, however, a late ripener and, therefore, best suited for sowing on rich soils in early districts. This variety has now been included in these trials in two seasons, in each of which it has given practically the same results as Glasnevin Sonas. The third variety, Ardri, which was included for the first time in these trials in 1934, was produced at the Albert Agricultural College, and is the result

of a cross between Glasnevin Sonas and Victory II. In the past season's trial it produced returns equal to those obtained from Glasnevin Sonas and Sonas Marvellous. It has also been found in the first season's trials to resist lodging quite as well as the other two varieties included in the tests. It has the advantage over the latter of ripening 3 to 5 days earlier.

MANURIAL TRIALS WITH CLARE PHOSPHATE AND OTHER PHOSPHATIC MANURES.

Since the year 1926, tests to compare Clare phosphate as a top-dressing for pasture with other forms of phosphatic manures commonly used in farming practice have been conducted at numerous centres, and the results of these tests have appeared in Vol. XXX, No. 1 of the Department's Journal. In the early years these trials with phosphatic manures on pasture had not been confined to any particular type of soil, and generally the results obtained showed that Clare phosphate was inferior to the other forms of phosphate tried for the purpose of top-dressing pastures. At a few of the centres, however, where the soil was of a peaty nature, it was noticed that the Clare phosphate produced a considerable improvement in the earliness of growth and an increase in the quantity of clovers. As a result of the improvement produced at these few centres by the addition of Clare phosphate, it was decided in 1930 to commence a new series of pasture manurial tests to be confined entirely to the use of Clare phosphate, North African Mineral phosphate and Semsol, on soils of a peaty nature. These tests were kept under observation until the end of the 1933 grazing season, and the results noted were published in Department's Journal, Vols. XXX, No. 2; XXXI, No. 1 and XXXII, No. 1. In each season from 1930 to 1933 inclusive, the North African Mineral phosphate and the Semsol, with one or two exceptions, produced a marked improvement in the quality and quantity of the pasture on the plots to which they were applied.

It was only at three centres that the Clare phosphate produced results comparable to those obtained from the use of the other phosphatic manures. At the other centres the Clare phosphate gave practically negligible results.

In 1933 another series of pasture manurial demonstrations was started, with the object of comparing Clare phosphate from a new seam with North African Mineral phosphate as a source of phosphates for top-dressing pasture, mainly on peaty soils. The Clare phosphate was applied at the rate of 10 cwt. per statute acre, and the North African Mineral phosphate at the rate of 8 cwt. per statute acre. The two manures were applied to pasture at 138 centres, and at 102 of these centres the soil was definitely of a peaty nature.

At over 90 per cent. of the centres the application of North African Mineral phosphate resulted in a distinct increase in the clover content and general appearance of the pasture in the season of application. At five of the centres the Clare phosphate produced in the same season a result equal to that produced by the North African Mineral phosphate, and at

75 other centres the improvement resulting from the application of Clare phosphate, though slight, was noticeable by the greener appearance of the herbage as compared with that on control plots. At the remaining 58 centres there was no visible improvement as a result of top-dressing with Clare phosphate. A full report of these trials has already appeared in the Department's Journal, Vol. XXXIII, No. 1.

During the season 1934 these plots were again kept under observation, and reports on the appearance of the plots during the year, and up to the close of the grazing period, were received from 122 centres. At 109 of these centres a considerable increase in the quantity of clovers and grasses in the pasture, as a result of the top dressing with North African Mineral phosphate, was observed. At 10 other centres the improvement was described as fair, while at the remaining 3 centres only a slight improvement was noticeable in the pasture as compared with the control plots.

In the case of the plots dressed with Clare phosphate, the reports show that at 14 centres there was a considerable improvement in the pasture—quite equal to that produced by North African Mineral phosphate. At 29 other centres clovers began to appear, and a fair improvement in the general appearance of the pasture could be observed. At 17 additional centres the reports indicated that, while the actual increase in quantity and quality of the pasture was very slight, there was evidence of a change in the colour of the pasture compared with that on the untreated plots. At the remaining 62 centres no improvement could be observed in the colour, the quantity or the quality of the herbage on the plots dressed with Clare phosphate. These plots will again be kept under observation during the coming season, and a report will be furnished to the Department at the end of the grazing season.

CROWN ROT IN SUGAR BEET

Since sugar beet became a commercial crop in this country the disease known as Crown Rot has in some years caused serious damage to the crop in certain districts. Crown Rot generally becomes noticeable about mid-July in portions of crops growing on dry gravelly knolls and ridges. The apparent stages of the disease are, first, stoppage of growth of the heart leaves, frequently accompanied by a marked thickening and brittleness of the outer leaves; second, appearance of brown scab-like markings on the leaf stalks; third, blackening and death of the heart leaves; fourth, development of a number of secondary crowns, and fifth, decay of the crown and root of the plant. When weather and soil conditions are favourable for vigorous growth, the disease may be arrested and a crop of average yield and sugar content may be produced. The disease rarely attacks to the same extent all of the roots on the infected portion of a field. Although very serious failures of the beet crop, due to Crown Rot, have occurred for many years in other European countries on certain types of soil, and particularly in dry seasons, it is only recently that the cause of the disease and effective measures for its prevention and control have been discovered.

Previous observations in this country had shown that severe attacks of Crown Rot were invariably associated with pronounced alkalinity in gravelly and light soils, but more recently it has been proved by Brandenburg in Holland that a deficiency of available boron is the primary cause and that such deficiency can be corrected by adding to the soil a small quantity of borax—a compound of boron. Moreover, it is now accepted that the occurrence of Crown Rot is not directly due to alkalinity, but rather to the fact that under such conditions the crop is not, in a dry season, able to avail of the boron already in the soil.

The efficacy of the treatment discovered by Brandenburg has been confirmed by workers in other countries, including Saorstát Éireann, and in order to test this treatment under field conditions arrangements were made, in the 1934 season, for the Agricultural Instructors in Counties Carlow, Kildare, Kilkenny and Laoighis to conduct preliminary trials. At each selected centre, on portion of a field where sugar beet was attacked by Crown Rot in a previous season, an area was marked off and divided into four plots of equal size. In addition to the ordinary manuring for the sugar beet crop, three of the plots were dressed with 10lb., 20lb., and 30lb. respectively of ordinary finely powdered, commercially pure borax, and the fourth plot was left untreated as a control. This procedure was adopted at eleven centres, and the results are set out in the accompanying Table—Centres (1) to (11), inclusive. It will be noted that at each of these centres the borax was applied either about the time the crop was sown or a few weeks afterwards, and in no case later than June 15th.

No. of Centre	County	Date Borax was applied	Date Crop was Sown	Date of Weighing and Sampling	Did Crown Rot Develop ?	Yield of Roots per Statute Acre (Net Factory Weight)				Sugar Content of Roots			
						Lbs. of Borax per Statute Acre				Lbs. of Borax per Statute Acre			
						None	10lbs.	20lbs.	30lbs.	None	10lbs.	20lbs.	30lbs.
1	Carlow	(1934) 27th April	(1934) 27-28 April	(1934) 5th Nov.	Yes	T. 2.8 C. 5.12	T. 8.3 C. 12.8	T. 8.3 C. 12.12	T. 7.12 C. 12.12	% 15.3	% 17.2	% 16.0	% 16.9
2	Kildare	27th April	2nd May	17th Nov.	Yes	5.0	10.10	10.12	10.18	18.3	19.0	21.9	22.0
3	Kildare	1st May	7th May	23rd Nov.	Yes	5.2	8.9	8.18	8.17	15.8	16.1	16.3	15.7
4	Kildare	11th June	30th April	7th Nov.	Yes	5.16	9.15	13.4	13.9	16.4	17.2	17.5	18.2
5	Kilkenny	7th June	1st May	18th Nov.	Yes	7.15	11.16	12.18	13.6	15.8	14.2	15.2	16.1
6	Kilkenny	16th May	1st May	16th Nov.	Yes	4.18	7.19	10.10	10.18	14.5	17.1	18.0	19.0
7	Kilkenny	15th May	1st May	17th Oct.	Yes	9.7	8.1	9.16	12.6	14.7	16.5	17.5	15.7
8	Laoighis	2nd May	25th April	21st Nov.	Yes	10.2	10.4	10.6	10.17	19.0	17.5	19.4	19.1
9	Carlow	14th May	4th May	22nd Nov.	No.	10.4	9.2	9.14	10.12	18.2	18.7	19.6	19.0
10	Carlow	15th June	25th May	17th Nov.	No.	12.12	12.3	12.0	12.15	17.7	17.0	17.1	17.0
11	Laoighis	10th May	20th May	28th Nov.	No.	8.10	—	—	10.2	16.5	17.0	17.0	16.9
12	Kildare	10th Aug.	15th May	17th Dec.	Yes	2.15	—	—	8.12	16.1	—	—	18.1
13	Kildare	18th Aug.	11th May	26th Nov.	Yes	7.4	—	—	9.10	13.8	—	—	15.0
14	Kildare	27th Aug.	9th May	29th Nov.	Yes	5.2	—	—	8.3	15.7	—	—	16.0
15	Kilkenny	10th Aug.	1st May	15th Nov.	Yes	—	—	—	—	12.7	—	—	15.8
Average of Centres 1-8 where Borax was applied either before or soon after the sowing of seed and Crown Rot developed.						6.8	9.7	10.17	11.5	16.2	16.8	17.7	17.8
Average of Centres 9-11 where Borax was applied either before or soon after the sowing of seed and no Crown Rot developed.						10.19	10.10	10.13	11.8	17.5	17.6	17.9	17.6
Average of Centres 12-15 where Borax was applied after the crops were attacked by Crown Rot.						5.18	—	—	9.2	14.6	—	—	16.2

In order to ascertain the effect of an application of borax to crops affected with Crown Rot, plots were dressed during mid-August, at four further centres where the disease had already made its appearance. At each of these centres a dressing at the rate of 30lb. of borax per statute acre was applied, and the results are also included in the Table.

At all fifteen centres the borax was previously mixed with fine dry soil so as to facilitate the application of such light dressings. At centres (1) and (2), where the application took place previous to sowing the crop, the mixture was spread evenly over the plot before the drills were closed and at the remaining centres it was applied along the top of the drills.

At centres (1) to (8) inclusive the dressing of borax had little, if any, apparent effect on the crop until mid-July, when Crown Rot usually makes its appearance. In the majority of cases the disease then attacked most of the plants on the control plot and a considerable number on the plot dressed with 10lb. of borax. Only a few plants were attacked on the plot dressed with 20lb. of borax, while all of the plants on the plot dressed with 30lb. of borax were, apparently, free from attack.

The average returns from centres (1) to (8) inclusive show that a low yield and low sugar content were obtained from the plots which received no borax; that the application of 10lb. of borax per acre produced a marked increase in yield and sugar content; that the application of 20lb. of borax produced a further satisfactory increase in yield and sugar content, but that the application of 30lb. of borax did not produce a significant increase in either yield or sugar content when compared with the effect of the 20lb. dressing. This result was rather unexpected, for throughout the growing season the foliage on the 30lb. plots looked more vigorous and was practically free from disease.

The average returns from centres (9), (10) and (11), where Crown Rot did not develop, show that the application of borax, even to the extent of 30lb. per acre, had no depressing effect either on yield or sugar content, which is very reassuring in view of the statements of certain investigators that a slight excess of boron in the soil is likely to depress both the yield and sugar content of sugar beet.

The average returns from centres (12) to (15) inclusive show that an application of borax at the rate of 30lb. per statute acre after the disease had made its appearance had the effect of improving both yield and sugar content to such an extent as to produce an increase of 70 per cent. in the yield of sucrose per acre.

As previously indicated, Crown Rot is usually associated with pronounced alkalinity of the soil, and in order to ascertain whether such would be the case at these centres, arrangements were made to determine the pH value of the soil at each centre. Unfortunately, the sample from No. 11 was not furnished. The samples from Centres 9 and 10 corresponded to pH 5.8 in each case; those from Centres 5 and 7 to pH 7.85 and 7.70 respectively, while at each of the remaining centres a pH of over 8 was recorded.

As indicated at the outset, these experiments were merely of a preliminary nature, but, having regard to the striking results and to the serious losses caused by Crown Rot in dry seasons on certain alkaline soil areas in this country, it appears safe to assume that farmers who are growing beet on such soils should adopt the practice of applying borax at the rate of about 20lb. per statute acre to prevent Crown Rot, or to check its development, more especially on portions of fields where the disease has occurred in previous seasons. This applies particularly to portions of Counties Carlow, Kildare, Laoighis and Kilkenny, and to a lesser extent to portions of Tipperary and Offaly. Cases of Crown Rot have also been reported from a few districts in Counties Cork, Galway and Roscommon.

The beneficial effects of borax have been brought to the notice of the Irish Manure Manufacturers, who have made arrangements to place on the market this season supplies of the standard 4-4-1 sugar beet mixture in which the necessary proportion of borax, i.e., 21 lb., will be already incorporated. Arrangements are also being made whereby farmers, who have been in the habit of making up their own mixtures and who prefer to continue this practice, will be able to procure the necessary supplies of borax from merchants who usually stock artificial manures. Where the latter practice is adopted, about $1\frac{1}{2}$ stones of borax per statute acre may be expected to control Crown Rot. *The borax should be mixed with the superphosphate or with the potash salts in the standard mixture before the sulphate of ammonia is added.* Farmers who do not use borax at the time of sowing the seed, and whose crops may afterwards become affected with Crown Rot, should top-dress such crops with borax at the rate of about $1\frac{1}{2}$ stones per statute acre as soon as the disease appears. To facilitate application the borax should be mixed with sand or dry earth.

It is proposed to conduct experiments on similar lines during the coming season and it is, therefore, hoped that further information regarding the application of borax as a remedy for Crown Rot may be available before the 1936 sugar beet crop is sown. In the meantime, the Department have no hesitation in recommending growers in affected districts to use borax for the 1935 sugar beet crop, either through the medium of the prepared mixture or otherwise as suggested above.

As the addition of lime indirectly increases the liability to Crown Rot, an application of lime should on no account be given to land where the disease has already occurred or is likely to occur.

It should be clearly borne in mind that borax in excessive quantity is a plant poison, and that a dressing in excess of the maximum dressing of 30lb. per statute acre used in these trials may depress both yield and sugar content of the crop. In any event, these experiments indicate that there is no necessity to incur extra expense by applying a greater quantity of borax than about $1\frac{1}{2}$ stones per statute acre.

CULTIVATION OF TOMATOES

That the tomato is now generally recognised in this country as a nutritious and appetising article of food is indicated by the quantity imported. Thus in 1934 over 65,000 cwts. of tomatoes were imported, valued at £128,100.

While the commercial production of this crop in Saorstát Éireann is already an important industry, the large imports show that there is room for considerable expansion in home tomato-growing.

Though it is possible in certain areas of the country, and in favourable seasons, to grow tomatoes successfully in the open, any extension of the industry on a commercial scale can be brought about only by growing the crop under glass.

TYPE OF GLASSHOUSE.

Growers differ so much in their requirements that it is not possible in this article to deal with the erection of glasshouses. A number of Saorstát firms now specialise in the making and erection of glasshouses for the growing of tomatoes, and it is suggested that intending growers should consult the Horticultural Instructor for their district as to the type of house best suited to their requirements, and as to the best and cheapest method of having the house erected.

SITE.

It is important to select a site that is free from shade, as sunlight is essential to successful tomato-growing, more especially in unheated houses; the yield of tomatoes is intimately related to the amount of sunshine and to the light intensity during the growing period.

Good drainage is essential, as stagnant water induces disease in the crop.

SOIL AND MANURES.

A deep friable soil is best suited to tomato culture, although satisfactory crops may be produced on heavier types of soils. Soil which has been under ordinary cultivation and is in fairly good condition should be deeply trenched, and a manurial dressing of 4st. farmyard manure, 2lb. sulphate of potash, $\frac{1}{2}$ lb. superphosphate and $\frac{1}{2}$ lb. steamed bone flour per 8 square yards should be worked in at time of digging. After digging, lime, at the rate of $1\frac{1}{2}$ lb. per 8 square yards, should be lightly forked in. A better result is obtained if the bed is prepared in early winter; a crop of lettuce may be taken off previous to planting, if desired.

SEED.

Great care should be taken to procure good seed, which should be purchased from a grower or seedsman of repute. The aim should be to

secure plants that are sturdy growers, which "set" well and produce heavy crops of fruit of good colour and uniform size. The following are popular commercial varieties and are recommended :—The Mackey, Kondine Red, Ailsa Craig, and Sunrise. An ounce of seed properly treated will produce about 4,000 plants.

SOWING.

Where only a small number of plants is required, seeds may be sown in pots or pans, but where large numbers are needed it is best to sow in seed boxes constructed of light wood, and measuring approximately 16 x 12 x 2½ inches.

When the plants are to be grown in a heated greenhouse, the seeds should be sown in mid-December, in which circumstance the crop will be ready to gather early in June. When the greenhouse is unheated, or when the plants are to be grown out of doors, sowing of the seed should be delayed till the beginning of March.

The compost for seed sowing should be light and not too rich. A suitable mixture is 5 parts of sandy loam to 1 part of well-decayed stable manure with a sprinkling of lime. The boxes or other containers should be filled with compost to within ½-inch of the top. The seed should be thinly sown and lightly covered with finely sifted compost. The seed boxes should be watered with a very fine spray, covered with sheets of glass, with paper on top, and placed in a greenhouse at a temperature of 60° F. In about five or six days' time the young plants should appear, and, immediately they do, the glass and paper should be removed and the boxes placed in full light to prevent the seedlings from being overdrawn.

PRICKING OFF.

As soon as the first rough leaf has appeared the young plants are ready for pricking off. For small numbers 4-inch pots may be used, one plant being pricked off into each pot. For larger numbers shallow boxes of a suitable size to handle may be used, and the plants pricked out in rows three inches apart each way. The compost for the pots and boxes should be similar to that used for seed sowing, with the addition of a 6-inch potful of bone meal to each barrow of compost. The pots or boxes should be watered rather sparingly until the plants have developed good roots. Pricking off is performed by uprooting the little plants gently with the dibber with one hand; with the other hand the plant should be lifted, catching it by the seed-leaf and not by the stem. Care should be taken not to injure the stem. When the plant has been placed in position in the pot or box the soil at the root should be gently pressed with the fingers, taking care not to touch the stem. Boxes or other containers should provide good drainage, for, if the soil becomes water-logged, the roots decay. The temperature of the house should be raised to a minimum of 63° F. at night until the plants are established in the pots, when it may be allowed to go back to 60° F. A maximum and minimum thermometer is almost a necessity in tomato-growing.

PLANTING OUT.

The plants are ready for planting out when they have eight or nine rough leaves. The soil of the bed should be moist but not too wet, and should have a temperature of 57° F. if possible. Cold soil is exceedingly injurious to the roots of tomato plants. In order to warm the soil the heat should be turned on fourteen days before planting. An unheated house should be kept closed and planting out deferred until about the middle of April. The plants should be placed in the house some days before they are to be planted so as to harden them off. The pots should be watered half an hour before planting. The plant should be carefully removed from the pot by gently tapping the side of the latter so as to leave the ball of soil intact, and should be planted with the surface of the ball just below the level of the soil surface. The plants should be a foot apart in the rows. The first row should be 15 inches from the second, while a passage 2½ feet wide should be left between the second and third rows, and so on alternately. With this alternate spacing of 15 inches and 30 inches between the rows each plant has, roughly, two square feet of soil to grow in, and there is ample space for free air circulation, for watering, and for tying the plants and gathering the fruit without injuring the plants in any of these operations. Between the time the plants are put out and the setting of the second truss, water should be given sparingly, otherwise soft, sappy growth will ensue and the first flowers will fail to set. The actual ball of soil containing the roots must not be allowed to get dry and will require watering three days after planting out. When the plants are in flower a light overhead syringing helps the set of the first truss of fruit.

CULTIVATION IN BOXES, TUBS, ETC.

This method of cultivation may be adopted for growing tomatoes either in houses or out of doors. Used butter boxes, 12-inch garden pots, small tubs etc. are suitable containers, and the same procedure in regard to raising the plants should be adopted as for planting out in greenhouses. Small growers may, however, find it more convenient to buy plants ready for potting out and provided a convenient and reliable source is available this course can be recommended. Before finally potting out it is well to have the plants strongly developed in 5-inch or 6-inch pots. Whatever kind of container is used in which to plant out the tomatoes, proper provision should be made for drainage by putting a layer of broken crockery or cinders in the bottom. A suitable mould or compost for use in the boxes and pots consists of three parts of fibrous loam, one half part of burned garden refuse, and one part well-rotted manure. A 6-inch potful of bone meal should be added to each barrow load of this mixture. The containers should be half filled with the prepared compost and the plants carefully transplanted out and staked with canes of suitable length. The containers may then be removed into the greenhouse or to a suitable outdoor position. Immediately the first truss is well set, the containers should be filled up with compost to within an inch of the rim to allow for watering.

CULTIVATION OF BEDS IN THE OPEN.

Owing to the climatic conditions, outdoor tomato-growing cannot be recommended as a commercial enterprise in this country. Even when all cultural operations have been properly carried out during the summer, the crop may be ruined by a wet and sunless autumn. Given a well sheltered position, or when planted against a south or west wall, good crops may be procured, provided that during the months of August and September the weather is favourable. The best varieties for outdoor are Essex Wonder, Carter's Outdoor, and Sunrise.

The seeds should be sown early in March in the manner already described, and immediately the seedlings are large enough they should be potted into 4-inch pots, using a compost of 5 parts fibrous loam and 1 part well-rotted manure, old hot-bed manure being very suitable for this purpose, and a little bone meal. By the time the roots grow out to the sides of the pots the plants will be ready to re-pot into larger ones, and they should be grown on in heat until early in May, when they should be placed in a cool house or cold frame to harden off. The hardening-off process will take from a fortnight to three weeks, according to weather conditions. When thoroughly hardened off they should be planted in prepared soil, placing the plants 18 inches apart and making the soil firm around the roots. Any good garden soil will do, but it must be well drained, and a layer of well-decayed stable manure should be dug into the soil previous to planting out. If a quantity of fibrous loam is available it should also be dug in at the same time. Immediately after planting out, each plant should be loosely tied to a strong stake, and then the soil well watered immediately around the plants. Weather conditions chiefly will determine when they are again to be watered, but care must be taken not to over-water.

If the weather is cold after planting out, protection might be afforded at night by means of sacking or canvas attached to a frame shaped like an inverted V and set over the plants; this should be removed during the day. Any fruits not ripe by the end of September should be brought indoors and hung up to ripen unless the weather is particularly good.

TREATMENT OF GROWING PLANTS.

The following treatment of the growing plants is applicable whether the plants are grown indoors or outdoors, in containers or in beds:—

Watering.—As the plants develop after planting out they require a considerable amount of water, but in regard to this operation care and judgment must be exercised. The soil must not be water-logged, and outdoor plants require little watering, except during long periods of dry weather. It is safer for beginners to err on the side of too little water than of too much. From June to September a thorough watering once or twice a week, according to the weather, will be required in houses.

Pruning and Tying.—Tomatoes succeed best when grown on a single stem, all the lateral or side shoots being removed by pinching out immediately they are large enough to handle. This operation should be continued

throughout the season, and at no time should the shoots be allowed to grow long, as the strength of the plant is thereby impaired. Foliage may be slightly cut back when it has become so dense as to prevent free circulation of air and the penetration of sunlight to the soil and all parts of the plants. As the plants develop and many of the fruits have ripened, more foliage may be removed. Prunings or cut foliage must not, at any time, be allowed to lie about on the ground, as decaying leaves are liable to spread disease. They should be taken out of the house and placed on the rubbish heap to be burned as soon as possible.

With a view to securing tomatoes of good uniform size and colouring, the upward growth of the plants should be stopped at the sixth flower truss by cutting out the point of the plant at the second leaf above this sixth or last truss. The aim of the tomato-grower should be to procure from each plant at least five to eight pounds of fruit.

In small houses and for pot culture the plants should be supported by cane stakes, but in large houses they may be supported by strings of 4-ply "fillis" tied to wires pegged to the ground, the free ends of the "fillis" being secured to wires running along the rafters. As the plants grow up they should be twisted around the string.

TOP-DRESSING.

Tomatoes are gross feeders and respond well to suitable top-dressing during the growing season. Top-dressing should not, however, be begun before the second truss of fruit is set, otherwise succulent growth and bad setting will result. Liquid manure or a mixture of artificials or a combination of the two may be applied. A suitable mixture of artificials is :

- 3 parts superphosphate
- 1 part sulphate of potash
- 1 part sulphate of ammonia

A dressing at the rate of 2ozs. per square yard, or $\frac{1}{2}$ oz. to each pot or box containing one plant, may be given each week.

As the season advances, the potash should be reduced and the nitrogen increased. Liquid manure, diluted in five parts of water, may be applied with discretion once a week. If ordinary liquid manure from byres etc. is not available, a substitute may be prepared by placing $1\frac{1}{2}$ large bucketfuls of cow manure and 3lb. soot in a loose bran bag, suspending it in a 40-gallon barrel of water. The bag should be shaken up twice a day. At the end of four days the liquor is ready for use, and should be diluted (one part in three of water) and applied as for liquid manure.

By the time the first fruits show colour, a mulch of strawy stable manure should be placed on the soil over the roots of the plants. This holds the moisture in the ground, ensures the more even distribution of the water, and reduces the amount of watering necessary. Generally speaking, little

nitrogen and much potash should be given in a dull wet summer and the reverse in a hot dry one. Young tomato plants require more potash and less nitrogen than older plants.

VENTILATION.

Tomato houses require no ventilation before April; after that air should be given when the temperature in the house reaches 70° F. The ventilators of unheated houses should be closed early enough to retain the sun heat during the night, *i.e.*, about 5 o'clock in summer. In very hot weather plenty of ventilation should be given.

PICKING, GRADING AND MARKETING.

There is no hard and fast rule regarding the best time to gather the fruit, as this depends upon the distance from the market, and the weather conditions. During cool and sunless weather the fruits ripen more slowly, and should be allowed to remain on the plants until fairly well coloured. If the weather is warm, they should be gathered as soon as they begin to turn red, as they will colour up rapidly; if allowed to remain too long on the plants, they are liable to crack or become soft and unfit to send to a distant market. Only clean packages should be used when gathering the fruit, as both insect and fungoid pests are liable to be brought into the house with unclean packages. The fruits should be handled carefully and not bruised, either when picking or placing into the basket or box, and should, in all cases, be gathered with the stalk attached. They should be graded according to size, and the grade and weight should be indicated on the package. If small quantities are being sold they may be disposed of in 2, 3 or 4lb. chips; these are commonly used for local consumption. Where large quantities are being forwarded to distant markets, non-returnable chip baskets, or boxes, holding 12lb. each, should be used. These are handy packages and usually travel well. The fruit should be packed firmly enough to ensure that it will not move in the package during transit, and yet not so firmly as to be bruised. In marketing much depends upon the way in which the fruit is exposed for sale; a package of bright, even and attractively-packed fruit will always sell well and advertise itself. Care should be taken that no two varieties are packed in the same package, each variety and grade of that variety being placed in a separate package or box.

TOMATO DISEASES.

DAMPING-OFF OR FOOT ROT.

Damping-off of seedlings may be caused by any of a number of fungi, the more important of which are *Rhizoctonia Solani* (Kuhn), *Phytophthora sp.* and *Pythium de Baryanum* (Hesse).

Symptoms.—The young stems are attacked near the soil surface and become soft and dark brown, the top of the plant eventually falling over.

The disease is encouraged by crowding of the plants in the seed boxes, lack of ventilation, too much moisture and too high temperature. The disease spreads rapidly under these conditions, and affected seedlings are useless for propagation.

Prevention.—The prevention of the disease lies in proper attention to ventilation, moisture and temperature. The seed should be sown thinly so that the air will circulate properly around the young plants, and a proper circulation should be maintained in the house. The seed boxes should not be too heavily watered, and care should be taken that the moisture is evenly distributed.

TOMATO LEAF MOULD.

This disease is caused by the fungus *Cladosporium fulvum* Cke. and it is one of the commonest leaf diseases of tomatoes cultivated in greenhouses.

Symptoms.—The disease appears as velvety spots on the lower sides of the leaves. These spots have a downy growth of a pale buff colour, which changes to tawny-olive and finally violet-purple as the disease progresses and the tissues are killed. Soon after the spots appear on the under-surface, the top of the leaf immediately over the diseased spot turns pale-yellow colour which changes to ochre-yellow, and finally, on the death of the tissues, to reddish-brown. The fungus spreads rapidly over the leaf, which soon shrivels up, the whole leaf being covered with innumerable spores. The progress of the disease is dependent on the condition within the glass-houses, and the effect upon the plant varies with the extent of the disease. In slight attacks only the old leaves succumb, but in other cases the destruction of leaf area is so great that the plants are weakened and die prematurely, producing only a very light crop.

Prevention.—The disease is best controlled by allowing a free circulation of air and giving plenty of light to the plants.

POTATO BLIGHT OF TOMATOES.

Phytophthora infestans (Mont.) De Bary.

The fungus which causes ordinary potato blight also attacks tomatoes, both under glass and in the open. In glasshouses the disease is rarely serious, but wherever the crop is grown outdoors the disease usually appears on the plants from the end of July onwards.

Symptoms.—The fungus attacks both the foliage and fruit, but it is generally on the developing fruit that it is first noticed. Dark brown spots appear on the fruit; the diseased spots enlarge rapidly and may become sunken and soon involve from one-fourth to one-half of the fruit, the latter remaining more or less firm up to this stage.

Prevention.—Under conditions favourable to the fungus practically all the fruit on outdoor plants may be attacked unless spraying with the ordinary

Bordeaux or Burgundy mixture, as for potatoes, is carried out. In green-houses the disease can be kept in check by keeping the atmosphere dry.

TOMATO MOSAIC.

Infected plants show a mottled foliage; very often the mottled pattern varies considerably and several distinct viruses appear to be involved. The mosaic usually manifests itself by an abnormal leaf development, the leaves being sometimes blistered, and sometimes taking on a fern-like shape. These types may be accompanied by variegation, or mottling of foliage may develop without accompanying distortion.

Prevention.—Whilst most of the mosaics occurring naturally on tomatoes do not kill the plants, the yields of affected plants are small. As the disease is transferred from one plant to another by instruments, such as knives, and by insects, affected plants should not be handled at the same time as healthy ones, and insect control is an obvious necessity.

INSECT PESTS.

Amongst the insect pests which cause damage to tomato plants, the chief are White Fly, Wireworm, Eelworm and Greenfly.

WHITE FLY.

White Fly is a common pest on most greenhouse plants, and is most troublesome and destructive. The fly is very small, about one-twenty-fifth of an inch in length, and white in colour. Its young state is passed as a minute scale on the surface of the leaf, and infected plants show immense numbers of these scales. Spraying has proved of little value against this pest.

Great care should be exercised when bringing plants into the greenhouse from an outside source, as this is the usual method of introduction of the pest.

Recently a natural enemy of this Fly has been discovered in the form of a parasitic Chalcid wasp—*Encarsia formosa*. The female Chalcid lays an egg in the scale of the White Fly which is killed by the parasitic larva and turns black. If introduced at an early stage of the infestation this parasite will keep down the fly. Leaves of tomato with parasitised scales of the fly attached can be sent by post, and if hung up in a greenhouse will liberate the parasite which will at once attack the White Fly in the house. A fairly satisfactory fumigant of recent introduction is tetrachlorethane, usually sold as White Fly Fumigant. As the house must be kept closed for at least twelve hours, fumigation should be started in the evening. The ventilators should be tightly closed, and the tetrachlorethane, which is a volatile liquid, poured on the floor at the rate of 10 fluid ounces to 1,000 cubic feet of space in the house. The house must then be kept closed until the following morning, or until mid-day if the weather is not so hot as to scorch the plants. A second fumigation is necessary about three weeks after the first. The following plants are not injured by this form of fumigation:—Ferns,

Aspidistra, French Beans, Carnation, Cucumber, Marguerite and Fuchsia. The following are liable to damage and should be removed during fumigation :—Asparagus, Azalea Indica, Chrysanthemum, Cineraria and Dahlia.

WIREWORM.

Wireworms are the larvæ of clickbeetles. The beetles are about half an inch long, with narrow brownish bodies and pointed wing covers. The females lay their eggs in summer, usually in grass land. From these eggs grubs emerge, which are popularly called wireworms and which remain in the soil for three or more years. The grubs are narrow, smooth, hard skinned, yellow in colour and about three-quarters of an inch long.

Wireworms cause considerable damage by eating the roots of plants, sometimes destroying whole crops. If wireworms have been discovered in the new loam for use in the greenhouse, the loam should be sterilized, about a month before it is to be used, with a two per cent. solution of formaldehyde. The soil should be thinly spread out and the liquid sprinkled over it. It should then be placed in a heap and covered with sacks to confine the fumes, and left for twenty-four hours, by which time the grubs will be killed.

Very often when tomato-growers are commencing on new ground, or bringing into the house quantities of fresh soil from pasture lands, numbers of wireworms have to be dealt with. Where plants are being attacked in the house, baits of pieces of carrot or potato should be inserted in the soil near the plants; the wireworms will usually attack these and leave the tomatoes alone. These baits should be examined daily, and any grubs found should be destroyed and the baits replaced.

ROOT KNOT EELWORM.

This is a small insect which eats its way into the roots of the tomato plant. Once inside, it multiplies rapidly, forming colonies, and when an affected plant is lifted numbers of tubercles or irregularly-shaped swellings will be found on the roots. The eelworms suck the juices out of the roots and prevent the proper flow of the sap to the leaves, causing them to wilt, especially in sunny weather. The leaves then turn yellow, the plants die, and the insects then re-enter the soil and attack other plants.

Immediately a plant is seen to flag or wilt the roots should be examined, and if they are found to be affected, the whole plant should be dug up and burned, and the surrounding soil removed. Once a plant is attacked it is only a question of time until it dies, as there is no known cure.

Soil which has been found to be affected should not be used again unless it has been subjected to some form of sterilization, to ensure that the organisms have been killed. This may be done by heating the soil to 200°F. or by treatment with naphthalene or carbon bisulphide. Naphthalene is used by mixing two ounces to a barrow load of soil. Carbon bisulphide is very inflammable, and must be handled with great care. It should be used by mixing half an ounce to each barrow load of soil.

APHIS OR GREENFLY.

These at times cause serious damage to young tomato plants by sucking the juices out of the plants. They generally attack the growing points and young leaves ; they multiply very rapidly, and cause the leaves to curl up and the point of the shoot to become distorted, giving it a sickly appearance. Immediately these pests are noticed action should be taken to have them destroyed ; this may be done by spraying with a solution of half an ounce of pure nicotine to ten gallons of water.

SAORSTAT ÉIREANN

AN ROINN TALMHAÍOCHTA.

(Department of Agriculture).

NATIONAL EGG-LAYING COMPETITION, 1933-34.

The Twenty-second Egg-Laying Competition, conducted by the Department of Agriculture, was held at the Munster Institute, Cork, during a period of 48 weeks, beginning on the 10th October, 1933, and ending on the 10th September, 1934. The entries for the Competition were considerably in excess of the accommodation available. A total of 101 pens, of six pullets each, having satisfactorily fulfilled the required conditions, was accepted.

The Competition was arranged in Sections as follows:—

Section I.—White Wyandotte	..	..	..	25 pens
Section II.—Any sitting breed other than White Wyandotte	..	..	..	20 „
Section III.—Any non-sitting breed	..	..	..	7 „
Section IV.—White Wyandotte (confined to holders of Egg Distribution—hen and duck—Stations in the Irish Free State in 1933)	..	..	..	20 „
Section V.—Any sitting breed other than White Wyandotte (confined to holders of Egg Distribution—hen and duck—Stations in the Irish Free State in 1933)	..	..	..	29 „

Station holders were, as heretofore, allowed to enter a second pen in one of the open Sections on payment of the requisite entry fee.

As in the three previous Competitions, only pullets which were certified by the Veterinary College, Ballsbridge, Dublin, as being free from bacillary white diarrhoea, were accepted.

The clause introduced in the Regulations in 1928-29, whereby birds were required to be of specific minimum weights on arrival, was rigidly enforced. The following were the prescribed minimum weights for the respective breeds :—

All non-sitting breeds not less than $3\frac{1}{2}$ lbs.

White Wyandotte	„	„	$4\frac{1}{2}$	„
Rhode Island Red	„	„	$4\frac{1}{2}$	„
Plymouth Rock	„	„	5	„
Sussex	„	„	$5\frac{1}{2}$	„

Eggs were graded as follows :—

Egg Grades. Special grade— $2\frac{1}{8}$ ozs. and over for the first eight weeks (10th October to 4th December, inclusive).
 $2\frac{1}{4}$ ozs. and over throughout the remainder of the competition.

First grade— $1\frac{7}{8}$ ozs. for the first four weeks (10th October to 6th November, inclusive).

$1\frac{1}{8}$ ozs. for the second four weeks (7th November to 4th December, inclusive).

2 ozs. during remainder of competition.

Second Grade—Eggs which were not more than $\frac{1}{4}$ oz. less than the weight prescribed for first grade eggs in the same period.

Eggs which weighed less than the weight prescribed for second grade eggs were recorded separately, but were not included in the score total on which awards were based.

Special and first grade eggs were included in one category for the purpose of awarding prizes.

Egg Size. The improvement as regards egg size, noted in 1932-33 Test, was well maintained, only eleven pens being disqualified for producing more than 20 per cent. of second grade eggs. The respective percentage of each breed disqualified on this score in each of the seven Tests, since the clause was introduced in the Regulations, is given on Table VI.

Making no allowance for deaths, the average number of eggs per pullet was 185.1. The average number of eggs per pullet for which a record for the full 48-week period was available was 193.1. (See Table II). One White Wyandotte pullet and one Barred Rock pullet did not lay during the Test. The average yield per pullet and the percentage production for each breed during each of the twelve four-weekly periods are given on Tables VIII and IX respectively.

The average weight of egg for each of the competing breeds is given on Table V. Only one pen (Rhode Island Red) was disqualified for failing to reach the standard weight of 24 ozs. per dozen.

The respective number of ungraded eggs laid by pullets of each breed which completed the full 48-week period is given on Table VII.

Of the 542 pullets which completed the full 48-week period, 192 (or 35.4 per cent.) laid 200 first grade eggs or over, and not more than 20 per cent. second grade, as compared with 253 in the previous Test. With the exception of one pullet, which was not considered as suitable for breeding purposes, these were leg-banded with numbered and sealed copper rings. Their individual records are given on Table XIII.

In addition, three pullets (1 White Wyandotte and 2 Buff Rocks), which died during the Test qualified for copper rings. One pen (No. 11 White Wyandotte) had the distinction of being returned to its owner with six copper rings. The remainder of the rings were distributed as follows—

5 Pens—five copper rings each.

14	„	—four	„	„	„
14	„	—three	„	„	„
18	„	—two	„	„	„
26	„	—one	„	„	„

A total of 321 birds, representing 59.2 per cent. of the total for the full period, qualified for certificates. Of these, 99 birds (18.1 per cent.) were awarded Special certificates, 93 birds (17.1 per cent.) First Class certificates, and 129 birds (24.0 per cent.) Second Class certificates (See Tables XIV and XV).

Mortality. A total of 64 birds, or 10.6 per cent. of the total, died during the Competition. The deaths were confined to 48 pens, viz. :—

1 Pen—5 Deaths.
 1 „ —4 „
 2 Pens—3 Deaths each.
 10 „ —2 „ „
 29 „ —1 Death each.

Particulars as to the cause of death, and the percentage number of deaths for each breed are given on Tables XVI and XVII respectively.

The system of feeding was similar to that of previous Tests. The birds were fed three times daily. The morning feed consisted of half the grain ration given as scratch feed in the litter, the **Feeding.** mid-day feed of soft mash, and the evening feed of the remainder of the grain ration, which had been steeped 24 hours previously, fed in troughs. Dry mash was fed *ad lib.* The foods which were generally made up by weight corresponded approximately to the following formulæ for both wet and dry mash :—

4 parts Pollard.
 3 „ Bran.
 $2\frac{1}{2}$ „ Maize Meal Mixture.
 $\frac{1}{2}$ „ Sussex Ground Oats.
 1 „ Fishmeal.

The grain mixture consisted of equal parts of wheat, oats, and cracked maize. Vegetables and roots, such as cabbage, kale, turnips and mangels were fed in addition, and also grit and shell. The following quantities of foods were fed :—

Mixed Meals	..	29,568 lb.
Cracked Maize	..	} 21,504 „
Oats	..	
Wheat	..	
Grit and Shell	..	2,352 „

WHITE WYANDOTTES.

The majority of the birds in this Section were vigorous, well-developed specimens of their breed, of very good type and showed excellent body-size. The almost entire absence of pen **Section I.** unevenness was a pleasing feature, the birds having been carefully selected to ensure, as far as possible, similarity as regards age and appearance. As the Test advanced it was clear that they possessed to a marked degree that most important quality—namely stamina. With the

exception of one pen in which five birds died (the sixth had to be killed at the close of the Test), and in the case of another pen in which three birds died, the excellent general health of the birds testified to this, as did also the low mortality figure.

The egg yield for the first period was exceptionally good, over 80 per cent. of the birds being in production. Of the remainder, a little over 70 per cent. were not laying owing to moulting, while a few backward birds had not reached laying standard when the Test commenced. By the end of the winter period the majority of the birds were in full production, and both individual and average records were very creditable.

A consistent yield for the full period resulted in a very good average figure.

Size of egg was equally good as in the previous Test, only two pens being disqualified for producing more than twenty per cent. second grade.

One of the two birds which did not lay during the Test was from this Section.

Special mention must be made of the birds comprising the winning pen (No. 11) in this Section, which were also the winners of the Silver Cup. No comment is necessary as to their productive qualities. In appearance they were splendid specimens of their breed, typical in every way, showing excellent body-size without coarseness, and with very good head points especially as regards eye colour. Development over the test period was normal, and was in no way retarded by their high production. As regards quality of egg, the six birds were layers of good sound well-coloured eggs, the average weight being almost 2.3 oz. Six copper rings were awarded to this pen.

The entries in this Section varied considerably, and did not attain so high or so uniform a standard of quality as those in Section IV. Section I. While there were some attractive pens, notably for their size and evenness, there were others which were far too small, and which showed a marked tendency towards "cobbiness."

Early moulting was not quite so prevalent as in former Tests, only about 6 per cent. of the birds being affected. During the early stages of the Test the egg yield was lower than in Section I; but the birds improved greatly and finished with an average yield almost equal to that in Section I. Size of egg was very good.

The combined White Wyandotte entries showed that, on the whole, breeders have maintained the high degree of quality of their stock, which through consistent rigorous selection they have built up in recent years. With the exception of the few pens in Section IV, which lacked size, the birds were vigorous and well-developed in every respect, with excellent head points and sound eyes. As regards the latter, it may be well to remind breeders that sufficient attention is not always given to this point. Small defects of the eye often lead to grave faults such as total blindness, which renders the bird absolutely useless for breeding. Birds with light or defective eyes should, therefore, never be included in a breeding pen, or selected for Test. This year, this was not a noticeable fault among the

birds in these Sections, strong eye colour being exhibited in most cases.

It was pleasing to note that breeders have, to a great extent, succeeded in eradicating the great faults of immaturity, pen unevenness, and early moulting so outstanding in previous Tests. Haphazard selection is evidently not so common as it used to be, and breeders are realising that success largely depends on the right choice of birds for Test.

Another noticeable improvement was in the quality of egg produced, the majority of the birds being layers of strong-shelled eggs of nice shape and texture. On the whole, these were very creditable Sections, showing as they did the elimination of the most outstanding faults.

The general health records of the birds were excellent throughout, which proved that they were not lacking in the stamina necessary for sustained heavy production. It should be the aim of all breeders to maintain this degree of quality by continued consistent selection of stock birds.

WHITE LEGHORNS.

Only seven pens were entered in this Section. The decreased entries for a breed once so popular is to be regretted, especially
Section III. as the entries last year showed that breeders had built up body-size combined with egg-size in their stock. This improvement was exhibited by six of the entries this year, the birds being even as to type and of good body size. They showed a marked tightness of feather, and were good to handle. Eye colour was excellent. The birds in the remaining pen were rather backward and immature, and slow to come on to production.

As regards egg yield, production was inconsistent during the winter months, due to individual birds falling into moult, so that scores were not very high; but as the Test advanced the birds made steady progress, records for the full period being very good. Size, texture, and shape of egg produced was excellent.

SITTING BREEDS (OTHER THAN WHITE WYANDOTTE).

With few exceptions, the Rhode Island Reds in this Section were nice typical birds, showing good body-size and colour. Lack
Section II. of pen uniformity was more noticeable in this Section than in any other, individual birds being lacking in body-size, or mealy and smutty in appearance, and good pens were spoiled by the inclusion of such birds.

The Light Sussex were a nice promising lot, well marked and typical.

The one entry of Buff Rocks were rather small and slender for their breed, and proved to be poor producers.

Immaturity greatly affected the winter yield of the Rhode Island Reds, while early moulting among the Light Sussex was very marked, only one pen having a creditable record.

The average for the full period for all breeds in this Section was good.

As regards size of egg, only three pens were disqualified on this score.

There were some exceptionally fine birds among the Rhode Island Reds in this Section, which showed excellent body-size combined with very good colour

The Buff Rock entries were well chosen specimens as regards general appearance, being large well-developed birds of nice colour. The number of eggs produced by them was satisfactory; but size of egg was not so good as it might have been.

The Barred Rocks were handicapped by immaturity on arrival, many of the birds not coming into production until well into the winter period, consequently the scores for the full period were comparatively low. This was their only fault as, on the whole, they were a nice even lot of birds, well marked, and typical of their breed, possessing all the qualities of good stock birds.

The birds in the one pen of Light Sussex were good average producers; but were handicapped by the death of two birds.

Moulting was very slight; but on the other hand immaturity was very marked and, in consequence, the winter average was rather low. Records for the full period were, however, fairly good.

Were it not for the number of immature and backward birds in these Sections, records would have been far higher. As it was, the most important period was lost in bringing many of the birds up to laying standard. The correction of this fault is solely in the breeders' hands, and Test Managers can but advise them repeatedly to select suitable birds.

One Barred Rock in this Section did not lay during the Test.

TABLE I.

The following Table shows the number of pullets competing, the number of eggs laid, cost of food, return for eggs and gross profit for each of the twenty-two competitions held since 1912/13 :—

Eleven months ending	No. of Pullets	No. of Eggs Laid	Average Number per Bird	Average Value per Bird	Cost of Food per Bird	Average Price of Eggs per doz.	Return per Bird over Cost of Food
				s. d.	s. d.	d.	s. d.
31st Aug., 1913	318	38,199	120.1	11 2.8	5 8	13.05	5 6.8
" 1914	282	39,216	139.0	13 3.6	5 8.3	13.77	7 7.3
" 1915	264	39,764	150.6	17 6	7 0.5	16.75	10 5.5
" 1916	294	49,830	169.5	23 0.5	8 11.8	19.58	14 0.7
" 1917	210	36,660	174.6	32 7.2	13 10.7	26.89	18 8.5
" 1918	210	36,106	171.9	47 4	16 6	39.66	30 10.1
" 1919	306	55,124	180.0	53 3.4	20 0	42.59	33 3.4
" 1920	354	65,840	185.98	53 9	19 3.9	41.62	34 5.2
" 1921	288	51,584	179.0	40 9.5	18 7.3	32.79	22 2.2
9th Sept., 1922	342	63,518	185.72	33 8.8	11 10	26.15	21 10
16th " 1923	198	38,519	194.5	27 11.5	12 1	20.75	15 10.5
15th " 1924	342	61,144	178.78	26 6.5	11 1.5	21.37	15 5
15th " 1925	348	63,755	183.2	27 4.9	10 5.2	22.58	16 11.7
15th " 1926	342	65,137	190.4	28 6.1	10 7.8	21.5	17 10.3
16th " 1927	492	93,912	190.88	26 10.7	9 3.6	20.3	17 7.1
16th " 1928	510	95,226	186.7	24 10.9	10 8	19.2	14 2.9
16th " 1929	540	101,820	188.6	28 8.5	11 0.5	21.9	17 8
16th " 1930	588	100,752	171.3	24 4.2	8 5.8	20.5	15 10.4
16th " 1931	588	111,180	189.1	24 4	7 3	18.5	17 1
15th " 1932	600	111,986	186.6	21 3.6	6 4.2	16.4	14 11.4
12th " 1933	606	113,047	186.5	17 11.6	5 1.8	13.9	12 9.8
10th " 1934	606	112,177	185.1	19 5	5 8.9	15.1	13 8.1

It should be noted that the figures given in Table I above are based on the total number of pullets competing, no allowance having been made in respect of deaths during the test.

Taking the birds which died during the 1933-34 Test into account only up to the date of death, the average number of pullets for the whole period was 585.4, and the average number of eggs per bird 191.6. On this basis the average egg value per bird was 20s. 1.2d., the cost of food per bird 5s. 11.3d., and the return per bird over cost of food 14s. 1.9d.

On Tables II to IV pullets which died during the competition have been eliminated from the calculations and the averages for the remaining birds are given.

TABLE II.

Average Egg Yield from each Breed.

BREED	No. of Pullets for full period	No. of eggs laid	Average No. of eggs per pullet	GRADE AVERAGES PER PULLET		
				Special	First	Second
White Wyandotte ..	233	46,045	197.6	100.2	84.9	12.5
Rhode Island Red ..	172	33,534	195.0	72.9	98.3	23.8
White Leghorn ..	37	7,008	189.4	101.8	76.4	11.2
Buff Rock ..	33	6,545	198.3	44.0	117.1	37.2
Barred Rock ..	34	6,066	178.4	65.6	93.1	19.7
Light Sussex ..	33	5,483	166.1	71.1	80.3	14.7
All Breeds ..	542	104,681	193.1	84.2	90.8	18.1

TABLE III.

Number and Percentage of Special, First, and Second Grade Eggs for each Breed in respect of Pullets which completed the full 48-week Period.

BREED	EGGS LAID			PERCENTAGE DISTRIBUTION		
	Special Grade	First Grade	Second Grade	Special Grade	First Grade	Second Grade
White Wyandotte ..	23,355	19,789	2,901	% 50.7	% 43.0	% 6.3
Rhode Island Red ..	12,528	16,912	4,094	37.4	50.4	12.2
White Leghorn ..	3,767	2,825	416	53.8	40.3	5.9
Buff Rock ..	1,452	3,864	1,229	22.2	59.0	18.8
Barred Rock ..	2,230	3,164	672	36.7	52.2	11.1
Light Sussex ..	2,346	2,651	486	42.8	48.3	8.9
All Breeds ..	45,678	49,205	9,798	43.6	47.0	9.4

TABLE IV.

Number and Percentage of Pullets of each Breed which laid 200 First Grade Eggs and over, and not more than twenty per cent. Second Grade.

BREED	Number of Pullets for Full Period	Number of Pullets which laid 200 First Grade Eggs and over	Percentage of Pullets which laid 200 First Grade Eggs and over
			%
White Wyandotte	233	103	44.2
Rhode Island Red	172	53	30.8
White Leghorn	37	15	40.5
Buff Rock	33	6	18.2
Barred Rock	34	10	29.4
Light Sussex	33	5	15.1
All Breeds	542	192	35.4

In addition to the 192 pullets mentioned in Table IV above, three pullets (1 White Wyandotte and 2 Buff Rocks) which died during the Test laid 200 first grade eggs and over, and not more than twenty per cent. second grade.

TABLE V.

Average Weight of Egg for each Breed.

BREED	Total Number of Eggs Laid	Total Weight of Eggs	Average Weight of Egg	Average Weight Per Dozen
		lb. oz. dr.	oz. dr.	oz.
White Wyandotte ..	50,700	6,930 10 14	2 3.0	26.2
Rhode Island Red ..	35,028	4,682 12 10	2 2.2	25.7
White Leghorn ..	7,406	1,021 10 11	2 3.3	26.5
Buff Rock ..	7,113	928 2 9	2 1.4	25.1
Barred Rock ..	6,155	826 5 0	2 2.4	25.8
Light Sussex ..	5,775	779 10 9	2 2.6	25.9
All Breeds ..	112,177	15,169 4 5	2 2.6	26.0

The percentage number of pens of each breed which were disqualified for producing more than 20 per cent. of Second Grade eggs in each of the seven Tests, since the clause was introduced in the Regulations, is given on Table VI.

TABLE VI.

BREED	PERCENTAGE OF PENS DISQUALIFIED						
	1927-28	1928-29	1929-30	1930-31	1931-32	1932-33	1933-34
White Leghorn ..	38.8	19.0	45.0	40.0	15.8	—	—
White Wyandotte ..	54.8	35.3	47.2	22.8	—	11.1	4.4
Rhode Island Red ..	40.9	25.0	40.0	35.7	—	7.1	12.9
Buff Rock ..	—	—	14.3	28.5	—	—	33.3
Barred Rock ..	*	50.0	33.3	50.0	25.0	33.3	33.3
Light Sussex ..	50.0	33.3	25.0	60.0	—	—	16.7
Black Minorca ..	—	—	—	—	—	*	*
Australorp ..	100.0	—	—	*	*	*	*
Black Leghorn ..	—	*	*	*	*	*	*
Black La Bresse ..	100.0	*	*	*	*	*	*
Average ..	44.7	26.6	39.8	32.6	4.0	7.9	10.9

* Breed not competing.

TABLE VII.

Eggs under the prescribed weight for Second Grade.

BREED						Number of Pullets for full period which laid ungraded eggs	Number of ungraded eggs
White Wyandotte ..	..	..	..	..	..	31	62
Rhode Island Red ..	..	..	..	..	..	46	168
White Leghorn ..	..	..	..	..	..	7	13
Buff Rock ..	..	..	..	..	..	7	43
Barred Rock ..	..	..	..	..	..	7	12
Light Sussex ..	..	..	..	..	..	6	10
TOTAL ..	..	..	..	..	..	104	308

TABLE VIII.

Average Egg Yield per Pullet during each of the Twelve
Four-Weekly Periods.

BREED	Number of Pullets for full period	Oct. 10-Nov. 6	Nov. 7-Dec. 4	Dec. 5-Jan. 1	Jan. 2-Jan. 29	Jan. 30-Feb. 26	Feb. 27-Mar. 26	Mar. 27-Apr. 23	Apr. 24-May 21	May 22-June 18	June 19-July 16	July 17-Aug. 13	Aug. 14-Sept. 10	Average for full period
White Wyandotte	233	15.3	17.7	17.7	16.7	17.8	20.1	20.1	17.7	15.5	14.1	13.0	11.9	197.6
Rhode Island Red	172	11.5	15.3	16.5	15.6	17.7	20.0	21.3	19.6	16.7	14.9	13.4	12.3	195.0
White Leghorn	37	10.9	17.1	14.7	14.5	16.4	21.1	19.6	19.0	17.7	15.3	13.6	9.4	189.4
Buff Rock	33	12.4	13.0	16.5	17.1	19.3	29.6	22.0	19.4	17.3	16.0	14.1	11.6	193.3
Barred Rock	34	9.4	13.1	13.0	12.6	14.2	20.0	20.5	19.5	16.13	15.4	13.4	10.5	173.4
Light Sussex	33	13.3	13.4	12.3	11.6	19.3	20.7	17.9	14.0	11.3	10.6	8.9	8.3	163.1
All Breeds ...	542	13.1	16.0	16.4	15.8	17.7	20.2	20.5	18.5	15.0	14.4	13.0	11.6	192.1

TABLE IX.

Percentage Production for each Breed during each of the Twelve
Four-Weekly Periods.

BREED	Number of Pullets for full period	Oct. 10-Nov. 6	Nov. 7-Dec. 4	Dec. 5-Jan. 1	Jan. 2-Jan. 29	Jan. 30-Feb. 26	Feb. 27-Mar. 26	Mar. 27-Apr. 23	Apr. 24-May 21	May 22-June 18	June 19-July 16	July 17-Aug. 13	Aug. 14-Sept. 10
White Wyandotte	233	7.7	8.9	9.0	8.5	9.0	10.13	10.13	9.0	7.7	7.1	6.6	6.0
Rhode Island Red	172	5.9	7.8	8.5	8.0	9.1	10.9	10.9	10.12	8.6	7.7	6.9	6.1
White Leghorn	37	5.8	9.0	7.7	7.7	8.7	11.1	10.3	10.0	9.4	8.0	7.3	5.0
Buff Rock	33	6.3	6.6	7.8	8.6	9.7	10.4	11.1	9.8	8.7	8.1	7.1	5.8
Barred Rock	34	5.2	7.4	7.3	7.1	8.3	11.13	11.5	10.9	9.1	8.6	7.5	5.9
Light Sussex	33	8.0	8.1	7.7	8.8	11.6	12.5	10.8	8.4	7.1	6.4	5.3	5.3
All Breeds ...	542	6.8	8.3	8.5	8.2	9.2	10.5	10.6	9.6	8.2	7.4	6.7	6.0

NOTE.—Eggs which were under the weight prescribed for second grade are not included in the calculations in Tables VIII and IX above.

TABLE X.

Average Number of First Grade Eggs per Pullet during the period 10th October to 9th January, inclusive (92 days).

BREED	Number of Pullets	Number of First Grade Eggs	Average Number of First Grade Eggs per Pullet
White Wyandotte	269	12,915	48.0
Rhode Island Red	183	7,138	39.0
White Leghorn	41	1,553	38.0
Buff Rock	36	1,258	34.9
Barred Rock	35	1,099	31.4
Light Sussex	36	1,323	36.7
All Breeds	600	25,286	42.1

TABLE XI.

Pullets classified according to the number of First Grade Eggs laid from 10th October to 9th January, inclusive (92 days).

BREED	Number of Pullets	Pullets not laying up to 9th Jan.	FIRST GRADE EGGS					
			Under 30	30 and under 40	40 and under 60	60 and under 70	70 and under 80	80 to 83
White Wyandotte ...	269	2	54	24	92	74	22	*1
Rhode Island Red ...	183	4	57	28	58	25	9	†2
White Leghorn ...	41	—	10	13	17	1	—	—
Buff Rock ...	36	2	14	5	9	5	1	—
Barred Rock ...	35	2	17	2	12	2	—	—
Light Sussex ...	36	5	11	3	8	5	4	—
All Breeds ...	600	15	163	75	196	112	36	3

*Pullet No. 401, Pen 70—82 First Grade Eggs.

TABLE XII.

Percentage Distribution of Pullets of each Breed according to the number of First Grade Eggs laid from 10th October to 9th January, inclusive (92 days).

BREED	Pullets not laying up to 9th Jan.	FIRST GRADE EGGS					
		Under 30	30 and under 40	40 and under 60	60 and under 70	70 and under 80	80 to 83
White Wyandotte	% 0.7	% 20.1	% 8.9	% 34.2	% 27.5	% 8.2	% 0.4
Rhode Island Red	2.2	31.1	15.3	31.7	13.7	4.9	1.1
White Leghorn	—	24.4	31.7	41.5	2.4	—	—
Buff Rock	5.5	38.9	13.9	25.0	13.9	2.8	—
Barred Rock	5.7	48.6	5.7	34.3	5.7	—	—
Light Sussex	13.9	30.6	8.3	22.2	13.9	11.1	—
All Breeds	2.5	27.1	12.5	32.7	18.7	6.0	0.5

Altogether the entries in the Test under review were most satisfactory. With the exception of the winning pen, there were no outstanding scores ; but a good steady average was maintained throughout.

The excellent stamina of the birds resulted in a very low mortality figure for the first six months of the test. while the figure for the full period was reduced from 11.1 per cent. to 10.6 per cent. The number of birds which died from ovarian disorders were much lower than in previous years. The improved quality of egg was largely responsible for this decrease.

There were two faults which have yet to be entirely eradicated, namely pen-unevenness and immaturity. These can be very easily remedied, as all that is required is more attention to detail when making choice of birds. In many cases, particularly among Wyandottes, a distinct improvement has taken place ; but it is evident that a change of method of selection is advisable in others. Breeders should remember that to breed successfully they must have sound stock, and an individual knowledge of the merits of each bird in their stock. High records should not be allowed to influence the selection of birds showing defects in breeding. Selection of high-record birds lacking in vigour will eventually result in a decline in average production. It is far better to breed from average birds, which in all probability will produce better stock than themselves. Common sense, acute observation, and avoidance of extremes are the surest guides in the selection of stock birds. The primary consideration should be stamina, which is indicated by bright clear eyes and activity. Soundness of shell is a matter of importance, as birds which lay poor shelled eggs are most susceptible to ovarian diseases.

When the breeding stock has been well chosen, and the chickens are hatched out, faithful and intelligent culling should be practised, with the elimination of all "undesirables."

When the time for selecting entries comes round, choose from birds evenly developed, alike in good appearance, appetite, and energy. Each must be true to the type of its breed in good physical condition, and with promising plumage. They should be removed from the flock and kept under Test conditions for some time previous to despatch. The general management prior to Test is all-important, as the birds need time to settle down and become accustomed to change. As nothing more delays or decreases egg production than a change of house, management, or environment, the birds should be so cared for that the change to Test will be as slight as possible.

Feeding is likewise most important, and previous to sending their birds to the Test, breeders are advised and recommended beforehand by the Department to feed their birds on such foods as are used at the Test.

All pullets should be carefully examined for lice and scaly leg, and if necessary, treated with a light dressing of mercurial ointment for the former, and sulphur ointment for the latter.

Despatch the birds in a strong, roomy, well-ventilated hamper or box, taking special care that it is sufficiently large for their return. Some of the packages in which birds are sent are, in many cases, most unsuitable, being too small to allow the birds any comfort on their journey to the Test, and the sufferings in transit adversely affect the laying capacity of the pullets in the early part of the competition, when eggs are so valuable. Moreover, small boxes of this kind involve great risk to the birds when they are being returned to their owners.

An interesting feature of the Test is that at the close of the competition all birds were blood tested for Bacillary White Diarrhoea, and that only two birds reacted to the test, both being from the same pen, and one of which did not lay during the competition.

SECTION PRIZES.

SECTION I.—WHITE WYANDOTTE.

NAME AND ADDRESS OF OWNER	Total No. of Eggs Laid	No. of Second Grade Eggs	Value of Eggs	Average No. of Eggs per Bird
<i>First Prize (£10).</i> Mrs. M. Strong, Moate House, Kells (Ceanannus Mor), Co. Meath.	1,523	32	£ s. d. 8 2 4½	253.8
<i>Second Prize (£7).</i> Mrs. M. O'Donnell, Porthall, Clonleigh, Lifford, Co. Donegal.	1,282	15	7 4 9½	213.7
<i>Third Prize (£5).</i> Mr. W. Lawrence, Clonminch P.F., Tullamore, Offaly.	1,338	34	7 2 11½	223.0
<i>Fourth Prize (£4).</i> Mrs. L. Cox, Victoria Park, Donnycarney, Co. Dublin.	1,290	40	7 2 9	215.0
<i>Fifth Prize (£2).</i> Miss E. Powell, Curraghmore House, Borrisokane, Co. Tipperary.	1,267	21	7 0 11	211.2

SECTION II.—ANY SITTING BREED OTHER THAN WHITE WYANDOTTE.

NAME AND ADDRESS OF OWNER	Breed	Total No. of Eggs Laid	No. of Second Grade Eggs	Value of Eggs	Average No. of Eggs per Bird
<i>First Prize (£10).</i> Miss P. White, Gortnafluir P.F., Clonmel, Co. Tipperary.	Light Sussex	1,167	19	£ s. d. 6 14 4½	194.5
<i>Second Prize (£7).</i> Mr. W. Bland, Sallyford P.F., Rath, Portarlinton, Laoighis.	Rhode Island Red	1,215	103	6 13 4	202.5
<i>Third Prize (£5).</i> Mrs. E. Mahony, Ballinagrane, Borris, Co. Carlow.	Rhode Island Red	1,229	71	6 12 9½	204.8
<i>Fourth Prize (£4).</i> Mrs. M. Champion, Narraghmore Rectory, Ballytore, Co. Kildare.	Rhode Island Red	1,279	39	6 11 11½	213.2

SECTION III.—ANY NON-SITTING BREED.

NAME AND ADDRESS OF OWNER	Breed	Total No. of Eggs Laid	No. of Second Grade Eggs	Value of Eggs	Average No. of Eggs per Bird
<i>First Prize (£10).</i> Miss K. I. Cunningham, Monriade P.F., Naas, Co. Kildare.	White Leghorn	1,290	166	£ s. d. 6 12 6½	215.0

Note.—As there were only seven competing pens in this Section, the terms of the regulations governing the Competition precluded the award of any further prizes.

SECTION IV.—WHITE WYANDOTTE. STATION HOLDERS.

NAME AND ADDRESS OF OWNER	Total No. of Eggs Laid	No. of Second Grade Eggs	Value of Eggs	Average No. of Eggs per Bird
<i>First Prize (£10).</i> Mrs. M. Drohan, Ballynevin, Carrick-on-Suir, Co. Waterford.	1,348	118	£ s. d. 7 6 3½	224.7
<i>Second Prize (£7).</i> Mrs. M. Nagle, Springmount, Mallow, Co. Cork.	1,296	48	7 3 2	216.0
<i>Third Prize (£5).</i> Miss M. Mulcahy, Abbeyview, Clonmel, Co. Tipperary.	1,231	103	6 18 6½	205.2
<i>Fourth Prize (£4).</i> Mrs. M. P. Carville, Carrickaslane House, Castleblayney, Co. Monaghan.	1,293	193	6 15 6½	215.5

SECTION V.—ANY SITTING BREED OTHER THAN WHITE WYANDOTTE.
STATION HOLDERS.

NAME AND ADDRESS OF OWNER	Breed	Total No. of Eggs Laid	No. of Second Grade Eggs	Value of Eggs	Average No. of Eggs per Bird
				£ s. d.	
<i>First Prize (£10).</i> Miss C. Mealiff, Ballinamona House, Tullamore, Offaly.	Rhode Island Red	1,407	72	7 9 8	234.5
<i>Second Prize (£7).</i> Miss M. O'Donovan, Dromore, Villierstown, Cappoquin, Co. Waterford.	Rhode Island Red	1,301	50	7 2 3½	216.8
<i>Third Prize (£5).</i> Mrs. H. Bruce, Hill Brook, Birr, Offaly.	Rhode Island Red	1,287	7	6 13 9½	214.5
<i>Fourth Prize (£4).</i> Mrs. J. McCarthy, Caherelly Castle, Grange, Kilmallock, Co. Limerick.	Rhode Island Red	1,250	117	6 13 4½	208.3
<i>Fifth Prize (£2).</i> Mrs. A. McHugh, Claggan, Carrigart, Co. Donegal.	Rhode Island Red	1,234	87	6 12 4¾	205.7

SPECIAL PRIZES.

The Special Prize of a Silver Cup (or its value, £10) for the *Pen* of pullets laying eggs of the highest market value during the Competition, has been awarded to Mrs. M. Strong, Moate House, Kells (Ceanannus Mor), Co. Meath, for Pen No. 11 (White Wyandotte), which laid 1,523 eggs, value £8 2s. 4½d., and which also won first prize in Section 1.

The Special Prize of a Silver Medal (or its value, £2) for the *Pen* of Pullets (non-sitting breed) laying the highest number of first grade eggs during the period 10th October to 9th January, inclusive, has been awarded to Mrs. L. Burke, Santry Hall, Santry, Co. Dublin, for Pen No. 50 (White Leghorn), which laid 230 first grade eggs.

The Special Prize of a Silver Medal (or its value, £2) for the *Pen* of pullets (sitting breed) laying the highest number of first grade eggs during the period 10th October to 9th January, inclusive, has been awarded to Mrs. M. O'Donnell, Porthall, Cloneigh, Lifford, Co. Donegal, for Pen No. 24 (White Wyandotte), which laid 412 first grade eggs.

The Special Prize of a Silver Medal (or its value, £2) for the *Individual Bird* (non-sitting breed) laying the highest number of first grade eggs during the Competition, has been awarded to Miss K. Cunningham, Monreade P.F., Naas, Co. Kildare, for Pullet No. 264 (Pen No. 46, White Leghorn), which laid 261 first grade eggs.

The Special Prize of a Silver Medal (or its value, £2) for the *Individual Bird* (sitting breed) laying the highest number of first grade eggs during the Competition, has been awarded to Mrs. M. Strong, Moate House, Kells (Ceanannus Mor), Co. Meath, for Pullet No. 64 (Pen No. 11, White Wyandotte), which laid 275 first grade eggs.

The Special Prize of a Silver Medal (or its value, £2) for the *Individual Bird* (non-sitting breed) laying the highest number of first grade eggs during the period 10th October to 9th January, inclusive, has been awarded to Mrs. L. Burke, Santry Hall, Santry, Co. Dublin, for Pullet No. 286 (Pen No. 50, White Leghorn), which laid 68 first grade eggs.

The Special Prize of a Silver Medal (or its value, £2) for the *Individual Bird* (sitting breed) laying the highest number of first grade eggs during the period 10th October to 9th January, inclusive, has been awarded to Mr. W. Bland, Sallyford P.F., Rath, Portarlinton, Laoighis, for Pullet No. 188 (Pen No. 33, Rhode Island Red), which laid 83 first grade eggs.

PULLETS WHICH QUALIFIED FOR COPPER RINGS.

The following Table gives particulars of the 195 pullets which laid 200 first grade eggs or over, and not more than 20 per cent. second grade.

TABLE XIII.
WHITE WYANDOTTE (104 Pullets).

Pen Number	Pullet Number	Number of Sealed Copper Ring	EGGS LAID				OWNER
			Special Grade	First Grade	Second Grade	Total	
1	2	883	38	178	8	224	Mrs. R. Murphy, Newrath, Waterford.
	4	884	124	101	3	228	
	6	885	178	49	2	229	
3	13	886	48	159	5	212	Mrs. E. M. O'Hara, Mornington, Crookedwood, Co. Westmeath.
	16	887	49	173	8	230	
4	19	888	201	12	—	213	Miss E. Powell, Curraghmore House, Borrisokane, Co. Tipperary.
	20	889	48	185	13	246	
	22	890	198	13	—	211	
	23	891	188	25	1	214	
6	31	892	184	25	1	210	Miss A. G. Twigg, Greenwood, Malahide, Co. Dublin.
	33	893	67	160	11	238	
	34	894	167	35	—	202	
	36	895	141	81	—	222	
7	38	896	24	178	10	212	Mrs. J. R. Boyd, The Rectory, Killaloe, Co. Clare.
	40	897	150	58	2	210	
8	43	898	115	102	6	223	Mrs. W. D. Baker, Whitehall Towers, Rathfarnham, Co. Dublin.
	46	899	44	166	16	226	
	48	900	148	109	6	263	
9	51	901	173	41	1	215	Mrs. P. Connolly, Carrigamore, Corvalley, Co. Monaghan.
10	56	902	25	221	6	252	Mr. W. Lawrence, Clonminch P. F., Tullamore, Offaly.
	58	903	201	39	—	240	
	59	904	202	43	2	247	
	60	905	70	151	7	228	
11	61	906	103	145	3	251	Mrs. M. Strong, Moate House, Kells (Ceanannus Mor), Co. Meath.
	62	908	56	212	5	273	
	63	907	113	135	1	249	
	64	909	220	55	—	275	
	65	910	154	78	4	236	
	66	911	22	198	19	239	

Pen Number	Pullet Number	Number of Sealed Copper Ring	EGGS LAID				OWNER
			Special Grade	First Grade	Second Grade	Total	
13	74	912	195	8	—	203	Mr. W. Fraser, Twigs Park, Manorhamilton, Co. Leitrim.
	75	912	27	177	14	218	
14	79	914	83	131	16	230	Mrs. L. Cox, Victoria Park, Donnycarney, Co. Dublin.
	80	915	214	17	—	231	
	81	916	123	84	10	217	
	82	917	191	43	3	237	
	83	918	151	51	10	212	
16	93	919	143	58	—	201	Miss P. Brady, Newtowngirley, Ceanannus Mor, Co. Meath.
	95	920	40	183	9	232	
17	98	921	179	28	3	210	Rev. Bro. Bergin, Our Lady of Lourdes, Cahermoyle, Ardagh, Co. Limerick.
	100	922	145	62	—	207	
	101	923	105	111	6	222	
	102	924	140	80	9	238	
18	104	925	231	5	—	236	Mr. D. J. MacArthur, Breemount House, Laracor, Trim, Co. Meath.
	108	926	160	86	—	246	
19	109	927	42	175	6	223	Mrs. A. M. Murray, Tanderagee, Enfield, Co. Meath.
	110	928	89	157	20	266	
	112	929	114	89	3	206	
	114	930	115	115	3	233	
20	115	931	229	9	1	239	Miss P. Alley, Hill P. F., Athboy, Co. Meath.
21	123	932	145	72	—	217	Mrs. C. P. Chearnley, Glendoneen, Ballinhassig, Co. Cork.
	124	933	167	65	—	232	
	125	934	62	145	10	217	
	126	935	49	159	9	217	
22	130	936	189	17	—	206	Mrs. R. Croasdaile, Rynn, Rosentalis, Mountmellick, Laoighis.
	132	937	168	90	1	259	
23	138	938	97	174	8	279	Mrs. N. McElligott, Bedford, Listowel, Co. Kerry.

Pen Number	Pullet Number	Number of Sealed Copper Ring	EGGS LAID				OWNER
			Special Grade	First Grade	Second Grade	Total	
24	139	939	182	37	—	219	Mrs. M. O'Donnell, Porthall, Clonleigh, Lifford, Co. Donegal.
	140	940	45	180	10	235	
	141	941	178	30	—	208	
	142	942	112	129	—	241	
	143	943	148	67	2	217	
53	299	944	186	23	2	211	Miss M. Byrne, Montevideo, Roscrea, Co. Tipperary.
54	301	945	120	90	4	214	Mrs. M. Nagle, Springmount, Mallow, Co. Cork.
	302	946	176	68	—	244	
	304	947	192	35	1	228	
55	307	948	93	154	1	248	Miss N. O'Sullivan, Kiltanna, Knockaderry, Newcastle West, Co. Limerick.
	310	949	206	23	—	229	
57	324	950	203	22	—	225	Mrs. K. O'Driscoll, Lisloose, Tralee, Co. Kerry.
58	325	951	82	157	—	239	Mrs. M. P. Carville, Carrickaslane House, Castleblayney, Co. Monaghan.
	326	952	12	219	12	243	
	328	953	132	93	3	228	
	330	954	33	195	15	243	
59	331	955	210	37	1	248	Mrs. P. Lynch, Knockroe, Passage East, Co. Waterford.
	333	956	58	183	3	244	
	334	957	153	51	4	208	
	335	958	185	41	—	226	
	336	959	49	189	12	250	
60	337	960	202	20	1	223	Mrs. M. Kelly, Cedar Lodge, Rosslare Strand, Co. Wexford.
62	350	1,046	48	175	7	230	Mrs. R. Elkin, Leitrim House, Lecaney, Moville, Co. Donegal.
63	356	1,047	72	151	7	230	Miss K. Newman, Drinadaly, Trim, Co. Meath.
	357	1,048	197	9	1	207	
64	361	1,049	40	164	1	205	Miss C. M. Brogan, Phillistown House, Trim, Co. Meath.
	362	1,050	156	65	—	221	
	363	1,051	69	169	1	239	
	366	1,052	196	8	2	206	

Pen Number	Pullet Number	Number of Sealed Copper Ring	EGGS LAID				OWNER
			Special Grade	First Grade	Second Grade	Total	
66	375	1,053	176	48	—	224	Miss M. M. Bowe, Graigueavalla House, Errill, Ballybrophy, Laoighis.
	378	1,054	42	174	12	228	
67	379	1,055	159	68	1	228	Mrs. A. B. Barbour, Knockbeg House, Collooney, Co. Sligo.
	380	1,056	15	199	26	240	
	381	1,057	109	108	2	219	
	384	1,058	214	13	1	228	
68	386	1,059	70	156	8	234	Mrs. M. Drohan, Ballynevin, Carrick-on-Suir, Co. Waterford.
	387	1,060	196	19	—	215	
	388	1,061	211	28	1	240	
	389	1,062	28	181	24	233	
	390	1,063	185	19	1	205	
69	391	1,064	163	42	1	206	Mrs. M. J. Williams, Miltown, Kilmacow, Co. Kilkenny.
	393	1,065	47	162	9	218	
70	397	1,066	25	200	7	232	Miss M. Mulcahy, Abbeyview, Clonmel, Co. Tipperary.
	400	1,067	162	82	4	248	
	401	Dead	124	93	1	218	
71	410	1,068	69	144	3	216	Mrs. A. Keenan, Sreenty, Shantonagh, Castleblayney, Co. Monaghan.
72	513	1,069	214	4	—	218	Mr. M. Burchael, Kill, Co. Kildare.
	514	1,070	210	4	—	214	

RHODE ISLAND RED (52 Pullets).

Pen Number	Pullet Number	Number of Sealed Copper Ring	EGGS LAID				OWNER
			Special Grade	First Grade	Second Grade	Total	
26	148	1,071	133	71	4	208	Mrs. F. Gleeson, Tinarana, Killaloe, Co. Clare.
27	151	1,072	171	53	1	225	Mrs. M. Campion, Narraghmore Rectory, Ballytore, Co. Kildare.
	152	1,073	180	44	—	224	
	153	1,074	45	183	14	242	

Pen Number	Pullet Number	Number of Sealed Copper Ring	EGGS LAID				OWNER
			Special Grade	First Grade	Second Grade	Total	
28	158	1,075	49	186	3	238	Mrs. L. V. Lane Allman, Woodlands, Bandon, Co. Cork.
31	177	1,076	123	81	4	208	Mrs. K. Earl, Grantstown House. Waterford.
	180	1,077	121	92	3	216	
32	181	1,078	122	89	6	217	Miss A. D. Maude, The Lodge, Glendalough, Co. Wicklow.
33	189	1,079	184	20	3	207	Mr. W. Bland, Sallyford P.F., Rath, Portarlinton, Laoghis.
	191	1,080	98	139	12	249	
	192	1,081	82	131	4	217	
34	193	1,082	90	132	1	223	Mrs. M. Danaher, Knockalton P. F., Nenagh, Co. Tipperary.
	196	1,083	17	188	38	243	
	197	1,084	173	48	1	222	
35	199	1,085	69	152	4	225	Mrs. M. G. King, Beech Grove, Donadea, Co. Kildare.
	202	1,086	25	184	10	219	
	204	1,087	35	196	20	251	
37	212	1,088	74	147	10	231	Mrs. M. A. Miller, Millview, Lenamore, Co. Longford.
	214	1,089	31	199	3	233	
38	218	1,090	95	113	5	213	Mrs. E. Mahony, Ballinagrane, Borris, Co. Carlow.
	221	1,091	201	5	—	206	
	222	1,092	180	54	1	235	
45	625	1,097	205	2	—	207	Mrs. B. Rafter, Knockthomas, Nurney. Bagenalstown, Co. Carlow.
73	419	1,098	53	149	12	214	Mrs. E. Loughrey, Drumunna, Crusheen, Co. Clare.
74	422	1,099	20	217	10	247	Mrs. E. M. Hodgins, Dangan, Roscrea, Co. Tipperary.

Pen Number	Pullet Number	Number of Sealed Copper Ring	Eggs Laid				OWNER
			Special Grade	First Grade	Second Grade	Total	
75	427	1,100	161	39	1	201	Miss M. O'Donovan, Dromore, Villierstown, Cappoquin, Co. Waterford.
	428	1,101	105	114	—	219	
	429	1,102	156	94	2	252	
	430	1,103	155	75	2	232	
	432	1,104	14	213	25	252	
77	440	1,105	191	15	—	206	Mrs. K. Sheehy, Bridge House, Ballingarry, Co. Limerick.
79	455	1,106	60	154	—	214	Miss J. Rowe. Moylaw, Crossmolina. Co. Mayo.
81	463	1,107	208	15	1	224	Mrs. A. McHugh, Claggan, Carrigart, Co. Donegal.
	464	1,108	70	134	6	210	
	465	1,109	78	149	9	236	
	466	1,110	135	87	1	223	
83	475	1,111	115	120	1	236	Mrs. H. Bruce, Hill Brook, Birr, Offaly.
	478	1,112	251	7	—	258	
	479	1,113	107	149	2	258	
85	487	1,114	74	129	6	209	Mrs. A. R. Ferguson, Cloghboley, Co. Sligo.
	489	1,115	143	90	1	234	
86	494	1,116	24	208	24	256	Mrs. J. McCarthy, Caherelly Castle, Grange, Kilmallock, Co. Limerick.
	495	1,117	80	140	4	224	
	496	1,118	226	11	—	237	
	498	1,119	161	49	—	210	
87	499	1,120	202	32	2	236	Miss C. Mealiff, Ballinamona House, Tullamore, Offaly.
	500	1,121	226	14	1	241	
	502	1,122	128	104	2	234	
	504	1,123	128	93	3	224	
88	505	1,124	78	171	2	251	Mrs. O. McKenna, Doaghneys, Glasslough, Co. Monaghan.
	506	1,125	105	116	5	226	
89	520	1,126	58	152	6	216	Mrs. M. Smyth, Kileloon, Dunboyne, Co. Meath.

WHITE LEGHORN (15 Pullets).

Pen Number	Pullet Number	Number of Sealed Copper Ring	EGGS LAID				OWNER
			Special Grade	First Grade	Second Grade	Total	
46	261	1,008	208	41	1	250	Miss K. I. Cunningham, Monriade P. F., Naas, Co. Kildare.
	264	1,009	154	107	7	268	
47	266	1,010	46	166	4	216	Mrs. E. Hornidge, Tulfarris P. F., Blessington, Co. Wicklow.
	267	1,011	122	97	3	222	
	268	1,012	184	33	4	221	
48	273	1,013	175	38	—	213	Mrs. M. E. Higgins, Carramarla Lodge, Claremorris, Co. Mayo.
	275	1,014	103	115	—	218	
	276	1,015	154	57	—	211	
50	283	1,016	185	17	1	203	Mrs. L. Burke, Santry Hall, Santry, Co. Dublin.
	284	1,017	76	138	25	239	
	286	1,018	33	199	6	238	
51	291	1,019	35	182	18	235	Mrs. J. Simpson, Clonoulty, Goolds Cross, Co. Tipperary.
52	614	1,020	186	18	1	205	Mrs. M. A. Walsh, Wardstown, Athboy, Co. Meath.
	617	1,021	169	33	—	202	
	618	1,022	186	15	—	201	

BUFF ROCK (8 Pullets).

Pen Number	Pullet Number	Number of Sealed Copper Ring	EGGS LAID				OWNER
			Special Grade	First Grade	Second Grade	Total	
90	525	Dead	210	33	—	243	Sister-in-Charge, The Technical School, Stradbally, Laoighis.
	528	1,127	32	210	14	256	
91	529	1,128	167	51	1	219	Mrs. J. A. Donegan, Blakestown, Ardee, Co. Louth.
	531	1,129	164	66	2	232	
	533	1,130	55	178	4	237	
92	537	1,131	40	182	21	243	Mrs. M. T. Ffrench, "Poulfaille," New Ross, Co. Wexford.
94	560	1,132	26	183	12	221	Mrs. B. McKenna, Gilltown, Navan, Co. Meath.
	562	Dead	76	124	5	205	

BARRED ROCK (10 Pullets).

Pen Number	Pullet Number	Number of Sealed Copper Ring	EGGS LAID				OWNER
			Special Grade	First Grade	Second Grade	Total	
96	580	1,134	236	17	—	253	Mrs. H. McGowan, Aughavohil, Kinlough, Co. Leitrim.
97	583	1,135	19	182	8	209	Miss B. Power, Slieverue, Butlerstown, Co. Waterford.
	585	1,136	23	182	12	217	
	586	1,137	57	164	6	227	
	588	1,138	130	72	1	203	
99	599	1,139	153	75	1	229	Mrs. M. A. Kelly, Carranstown, Ballivor, Co. Meath.
100	601	1,140	118	86	—	204	Mrs. E. A. Henderson, Ardrum, Inniscarra, Co. Cork.
	602	1,141	191	10	2	203	
	603	1,142	123	92	3	218	
	606	1,143	42	158	5	205	

LIGHT SUSSEX (5 Pullets).

Pen Number	Pullet Number	Number of Sealed Copper Ring	EGGS LAID				OWNER
			Special Grade	First Grade	Second Grade	Total	
40	231	1,093	73	139	7	219	Miss P. White, Gortnafluir P. F., Clonmel, Co. Tipperary.
	233	1,094	128	90	1	219	
42	245	1,095	72	139	5	216	Rev. J. R. O'Rourke, Blacklion P. F., Blue Ball, Tullamore, Offaly.
44	257	1,096	39	176	14	229	Miss D. M. Place, Rosemount, New Ross, Co. Wexford.
95	566	1,133	34	168	7	209	Miss E. Walsh, Ballylemon Lodge, Cappagh, Co. Waterford.

CERTIFICATES OF MERIT.

Certificates were awarded as follows:—

- (a) A Special Certificate for individual birds laying 220 first grade eggs or over.
- (b) A First Class Certificate for individual birds laying 200 but less than 220 first grade eggs.
- (c) A Second Class Certificate for individual birds laying less than 200, but over 170 first grade eggs.

Individual birds producing more than twenty per cent. of second grade eggs were ineligible for Certificates.

The following Tables give particulars of the number of eggs laid by individual birds which qualified for Certificates, together with the Class of Certificate awarded in each case:—

TABLE XIV.
SECTION I.—WHITE WYANDOTTE.

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
Mrs. R. Murphy, Newrath, Waterford.	1	1	180	3	183	Second
		2	216	8	224	First
		3	192	22	214	Second
		4	225	3	228	Special
		5	191	—	191	Second
		6	227	2	229	Special
Mrs. M. Deegan, Roadside P.F., Lodge Park, Freshford, Co. Kilkenny.	2	9	183	20	203	Second
		10	175	14	189	Second
Mrs. E. M. O'Hara, Morningson, Crookedwood, Co. Westmeath.	3	13	207	5	212	First
		15	190	36	226	Second
		16	222	8	230	Special
Miss E. Powell, Curraghmore House, Borrisokane, Co. Tipperary.	4	19	213	—	213	First
		20	233	13	246	Special
		21	197	1	198	Second
		22	211	—	211	Second
		23	213	1	214	First
		24	179	6	185	Second
Mrs. M. Sheehy, Ballyhabill, Ballingarry, Co. Limerick.	5	29	175	15	190	Second

NAME AND ADDRESS OF OWNER	Pen No	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
Miss A. G. Twigg, Greenwood, Malahide, Co. Dublin.	6	31	209	1	210	First
		33	227	11	238	Special
		34	202	—	202	First
		35	199	3	202	Second
		36	222	—	222	Special
Mrs. J. R. Boyd, The Rectory, Killaloe, Co. Clare.	7	38	202	10	212	First
		39	183	1	184	Second
		40	208	2	210	First
		41	176	4	180	Second
Mrs. W. D. Baker, Whitehall Towers, Rathfarnham, Co. Dublin.	8	43	217	6	223	First
		46	210	16	226	First
		48	257	6	263	Special
Mrs. P. Connolly, Carrigmore, Corvalley, Co. Monaghan.	9	49	179	6	185	Second
		51	214	1	215	First
Mr. W. Lawrence, Clonminch P. F., Tullamore, Offaly.	10	55	183	16	199	Second
		56	246	6	252	Special
		58	240	—	240	Special
		59	245	2	247	Special
		60	221	7	228	Special
Mrs. M. Strong, Moate House, Kells (Ceanannus Mor), Co. Meath.	11	61	248	3	251	Special
		62	268	5	273	Special
		63	248	1	249	Special
		64	275	—	275	Special
		65	232	4	236	Special
		66	220	19	239	Special
Mrs. R. Craigie, Harrestown House, St. Margaret's, Co. Dublin.	12	72	186	2	188	Second
Mr. W. Fraser, Twigs Park, Manorhamilton, Co. Leitrim.	13	74	203	—	203	First
		75	204	14	218	First
		78	179	—	179	Second
Mrs. L. Cox, Victoria Park, Donnycarney, Co. Dublin.	14	79	214	16	230	First
		80	231	—	231	Special
		81	207	10	217	First
		82	234	3	237	Special
		83	202	10	212	First
Captain N. H. Medcalf, Dalkey Avenue, Dalkey, Co. Dublin.	15	85	173	1	174	Second
		88	197	—	197	Second
		89	196	—	196	Second

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
Miss P. Brady, Newtowngirley, Ceanannus Mor, Co. Meath.	16	91	190	11	201	Second First Special
		93	201	—	201	
		95	223	9	232	
Rev. Bro. Bergin, Our Lady of Lourdes, Cahermoyle, Ardagh, Co. Limerick.	17	98	207	3	210	First First First Special
		100	207	—	207	
		101	216	6	222	
		102	229	9	238	
Mr. D. J. MacArthur. Breemount House, Laracor, Trim, Co. Meath.	18	104	236	—	236	Special Second Special
		105	193	9	202	
		108	246	—	246	
Mrs. A. M. Murray, Tanderagee, Enfield, Co. Meath.	19	109	217	6	223	First Special First Second Special
		110	246	20	266	
		112	203	3	206	
		113	192	2	194	
		114	230	3	233	
Miss P. Alley. Hill P. F., Athboy, Co. Meath	20	115	238	1	239	Special Second
		118	175	2	177	
Mrs. C. P. Chearnley. Glendoneen, Ballinhassig, Co. Cork.	21	123	217	—	217	First Special First First
		124	232	—	232	
		125	207	10	217	
		126	208	9	217	
Mrs. R. Croasdaile, Rynn, Rosenallis, Mountmellick.	22	130	206	—	206	First Second Special
		131	187	—	187	
		132	258	1	259	
Mrs. N. McElligott, Bedford, Listowel, Co. Kerry.	23	134	176	2	178	Second Second Second Special
		135	175	10	185	
		137	196	—	196	
		138	271	8	279	
Mrs. M. O'Donnell, Porthall, Clonleigh, Lifford, Co. Donegal.	24	139	219	—	219	First Special First Special First
		140	225	10	235	
		141	208	—	208	
		142	241	—	241	
		143	215	2	217	
Mrs. L. Ahern, Ballymagooly, Mallow, Co. Cork.	25	620	184	29	213	Second Second Second
		621	180	2	182	
		623	195	15	210	

SECTION II.—SITTING BREEDS (other than White Wyandotte).

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
<i>Rhode Island Red.</i> Mrs. F. Gleeson, Tinarana, Killaloe, Co. Clare.	26	147 148 150	198 204 188	15 4 —	213 208 188	Second First Second
<i>Rhode Island Red.</i> Mrs. M. Campion, Narraghmore Rectory, Ballitore, Co. Kildare.	27	151 152 153 154 155 156	224 224 228 186 189 189	1 — 14 2 22 —	225 224 242 188 211 189	Special Special Special Second Second Second
<i>Rhode Island Red.</i> Mrs. L. V. Lane-Allman, Woodlands, Bandon, Co. Cork.	28	158 161	235 185	3 15	238 200	Special Second
<i>Rhode Island Red.</i> Miss D. Strong, Moate House, Kells (Ceanannus Mor), Co. Meath.	29	165 166 167	194 194 193	1 10 13	195 204 206	Second Second Second
<i>Rhode Island Red.</i> Mrs. J. Kirkwood, Derryearne, Dromod, Co. Leitrim.	30	170 171	175 197	36 2	211 199	Second Second
<i>Rhode Island Red.</i> Mrs. K. Earl, Grantstown House, Waterford.	31	176 177 179 180	181 204 198 213	1 4 — 3	182 208 198 216	Second First Second First
<i>Rhode Island Red.</i> Miss A. D. Maude, The Lodge, Glendalough, Co. Wicklow.	32	181	211	6	217	First
<i>Rhode Island Red.</i> Mr. W. Bland, Sallyford, P. F., Rath, Portarlinton, Laoighis.	33	187 188 189 191 192	190 240 204 237 213	— — 3 12 4	190 240 207 249 217	Second Special First Special First
<i>Rhode Island Red.</i> Mrs. M. Danaher, Knockalton P. F., Nenagh, Co. Tipperary.	34	193 194 196 197 198	222 196 205 221 186	1 2 38 1 3	223 198 243 222 189	Special Second First Special Second

NAME AND ADDRESS OF OWNER	Pen No	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
<i>Rhode Island Red.</i> Mrs. M. G. King, Beech Grove, Donadea, Co. Kildare.	35	199 202 204	221 209 231	4 10 20	225 219 251	Special First Special
<i>Rhode Island Red.</i> Mrs. A. L. Hurley, Belmont, Cobh, Co. Cork.	36	205 208 210	175 180 178	1 2 1	176 182 179	Second Second Second
<i>Rhode Island Red.</i> Mrs. M. A. Miller, Millview, Lenamore, Co. Longford.	37	212 214 215	221 230 178	10 3 2	231 233 180	Special Special Second
<i>Rhode Island Red.</i> Mrs. E. Mahony, Ballinagrane, Borris, Co. Carlow.	38	217 218 220 221 222	184 208 184 206 234	1 5 18 — 1	185 213 202 206 235	Second First Second First Special
<i>Light Sussex.</i> Miss P. White, Gortnafluir P. F., Clonmel, Co. Tipperary.	40	229 230 231 233 234	195 183 212 218 192	1 1 7 1 8	196 184 219 219 200	Second Second First First Second
<i>Light Sussex.</i> Rev. J. R. O'Rourke, Black Lion P. F., Blue Ball, Tullamore, Offaly.	42	242 243 245	173 172 211	— 3 5	173 175 216	Second Second First
<i>Light Sussex.</i> Mrs. E. M. Perceval, Temple House, Ballymote, Co. Sligo.	43	249	186	3	189	Second
<i>Light Sussex.</i> Miss D. M. Place, Rosemount, New Ross, Co. Wexford.	44	254 257	191 215	2 14	193 229	Second First
<i>Rhode Island Red.</i> Mrs. B. Rafter, Knockthomas, Nurney, Bagenalstown, Co. Carlow.	45	625 628 630	207 190 195	— 4 1	207 194 196	First Second Second

SECTION III.—NON-SITTING BREEDS.

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
<i>White Leghorn.</i> Miss K. Cunningham, Monriade P. F., Naas, Co. Kildare.	46	261 262 264	249 195 261	1 18 7	250 213 268	Special Second Special
<i>White Leghorn.</i> Mrs. E. Hornidge, Tulfarris P. F., Blessington, Co. Wicklow.	47	266 267 268 269	212 219 217 176	4 3 4 1	216 222 221 177	First First First Second
<i>White Leghorn.</i> Mrs. M. E. Higgins, Carramarla Lodge, Claremorris, Co. Mayo.	48	271 273 274 275 276	192 213 180 218 211	— — 1 — —	192 213 181 218 211	Second First Second First First
<i>White Leghorn.</i> Mrs. M. E. Shanley, Dromard, Dromod, Co. Leitrim.	49	277 280	187 187	2 2	189 189	Second Second
<i>White Leghorn.</i> Mrs. L. Burke, Santry Hall, Santry, Co. Dublin.	50	283 284 285 286 288	202 214 172 232 171	1 25 5 6 1	203 239 177 238 172	First First Second Special Second
<i>White Leghorn.</i> Mrs. J. Simpson, Clonoulty, Goold's Cross, Co. Tipperary.	51	290 291 293	178 217 196	17 18 —	195 235 196	Second First Second
<i>White Leghorn.</i> Mrs. M. A. Walsh, Wardstown, Athboy, Co. Meath.	52	614 617 618	204 202 201	1 — —	205 202 201	First First First

SECTION IV.—WHITE WYANDOTTE.

STATION HOLDERS.

NAME AND ADDRESS OF OWNER	Pen No	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
Miss M. Byrne, Montevideo, Roscrea, Co. Tipperary.	53	296 299 300	186 209 178	— 2 —	186 211 178	Second First Second

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
Mrs. M. Nagle, Springmount, Mallow, Co. Cork.	54	301	210	4	214	First Special Second Special Second Second
		302	244	—	244	
		303	199	2	201	
		304	227	1	228	
		305	195	2	197	
		306	173	39	212	
Miss N. O'Sullivan, Kiltanna, Knockaderry, Newcastle West, Co. Limerick.	55	307	247	1	248	Special Second Special
		309	199	—	199	
		310	229	—	229	
Mrs. R. B. Eadie, The Poplars, Beaufort, Co. Kerry.	56	314	199	1	200	Second Second Second
		317	193	2	195	
		318	189	3	192	
Mrs. K. O'Driscoll, Lisloose, Tralee, Co. Kerry.	57	319	177	1	178	Second Second Special
		322	179	—	179	
		324	225	—	225	
Mrs. M. P. Carville, Carrickaslane House, Castleblayney, Co. Monaghan.	58	325	239	—	239	Special Special Special Special
		326	231	12	243	
		328	225	3	228	
		330	228	15	243	
Mrs. M. Lynch, Knockroe, Passage East, Co. Waterford.	59	331	247	1	248	Special Special First Special Special Special
		333	241	3	244	
		334	204	4	208	
		335	226	—	226	
		336	238	12	250	
Mrs. M. Kelly, Cedar Lodge, Rosslare Strand, Co. Wexford.	60	337	222	1	223	Special Second Second
		338	182	—	182	
		340	175	—	175	
Mr. P. Hannon. Deerpark, Croghan, Rhode. Edenderry, Offaly.	61	344	175	5	180	Second Second Second
		347	188	2	190	
		348	171	—	171	
Mrs. R. Elkin, Leitrim House, Lecaney, Moville, Co. Donegal.	62	350	223	7	230	Special Second Second
		351	174	4	178	
		353	179	2	181	
Miss K. Newman, Drinadaly, Trim, Co. Meath.	63	355	183	—	183	Second Special First Second Second
		356	223	7	230	
		357	206	1	207	
		358	176	—	176	
		359	185	—	185	

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
Miss C. M. Brogan, Phillistown House, Trim, Co. Meath.	64	361	204	1	205	First
		362	221	—	221	Special
		363	238	1	239	Special
		366	204	2	206	First
Miss M. O'Keeffe, Ballybooden, Knocktopher, Co. Kilkenny.	65	367	182	9	191	Second
		368	170	2	172	Second
		371	196	11	207	Second
		372	175	4	179	Second
Miss M. M. Bowe, Graigueavalla House, Errill, Ballybrophy, Laoighis.	66	375	224	—	224	Special
		377	180	2	182	Second
		378	216	12	228	First
Mrs. A. B. Barbour, Knockbeg House, Collooney, Co. Sligo.	67	379	227	1	228	Special
		380	214	26	240	First
		381	217	2	219	First
		384	227	1	228	Special
Mrs. M. Drohan, Ballynevin, Carrick-on-Suir, Co. Waterford.	68	386	226	8	234	Special
		387	215	—	215	First
		388	239	1	240	Special
		389	209	24	233	First
		390	204	1	205	First
Mrs. M. Williams, Miltown, Kilmacow, Co. Kilkenny.	69	391	205	1	206	First
		393	209	9	218	First
Miss M. Mulcaby, Abbeyview, Clonmel, Co. Tipperary.	70	397	225	7	232	Special
		398	189	2	191	Second
		400	244	4	248	Special
		401	217	1	218	First
Mrs. A. Keenan, Sreenty, Shantonagh, Castleblayney, Co. Monaghan.	71	409	190	—	190	Second
		410	213	3	216	First
		411	189	2	191	Second
Mr. M. Burchael, Kill, Co. Kildare.	72	511	192	15	207	Second
		512	173	—	173	Second
		513	218	—	218	First
		514	214	—	214	First

SECTION V.—SITTING BREEDS (other than White Wyandotte).
STATION HOLDERS.

NAME AND ADDRESS OF OWNER	Pen No	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
<i>Rhode Island Red.</i> Mrs. C. Loughrey, Drumumna, Crusheen, Co. Clare.	73	416 418 419 420	197 180 202 182	7 2 12 43	204 182 214 225	Second Second First Second
<i>Rhode Island Red.</i> Mrs. E. M. Hodgins, Dangan, Roscrea, Co. Tipperary.	74	421 422 423 425 426	181 237 172 199 198	5 10 3 8 23	186 247 175 207 221	Second Special Second Second Second
<i>Rhode Island Red.</i> Miss M. O'Donovan, Dromore, Villierstown, Cappoquin, Co. Waterford.	75	427 428 429 430 432	200 219 250 230 227	1 — 2 2 25	201 219 252 232 252	First First Special Special Special
<i>Rhode Island Red.</i> Mrs. H. Langrell, Killinure, Tullow, Co. Wicklow.	76	433 434 435	198 178 196	— — —	198 178 196	Second Second Second
<i>Rhode Island Red.</i> Mrs. K. Sheehy, Bridge House, Ballingarry, Co. Limerick.	77	440	206	—	206	First
<i>Rhode Island Red.</i> Mrs. M. Cruite, Tulla, Three Castles, Co. Kilkenny.	78	445 447	189 198	11 1	200 199	Second Second
<i>Rhode Island Red.</i> Miss J. Rowe, Moylaw, Crossmolina, Co. Mayo.	79	455	214	—	214	First
<i>Rhode Island Red.</i> Mrs. A. McHugh, Claggan, Carrigart, Co. Donegal.	81	463 464 465 466	223 204 227 222	1 6 9 1	224 210 236 223	Special First Special Special

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
<i>Rhode Island Red.</i> Mrs. H. Bruce, Hill Brook, Birr, Offaly.	83	475 476 477 478 479	235 180 195 258 256	1 — 4 — 2	236 180 199 258 258	Special Second Second Special Special
<i>Rhode Island Red.</i> Mrs. W. P. Delaney, Newtown House, Crettyard, Laoighis.	84	483	199	9	208	Second
<i>Rhode Island Red.</i> Mrs. A. R. Ferguson, Cloghboley, Co. Sligo.	85	487 489 491 492	203 233 197 196	6 1 15 1	209 234 212 197	First Special Second Second
<i>Rhode Island Red.</i> Mrs. J. McCarthy, Caherelly Castle, Grange, Kilmullock, Co. Limerick.	86	494 495 496 498	232 220 237 210	24 4 — —	256 224 237 210	Special Special Special First
<i>Rhode Island Red.</i> Miss C. Mealiff, Ballinamona House, Tullamore, Offaly.	87	499 500 501 502 504	234 240 199 232 221	2 1 5 2 3	236 241 204 234 224	Special Special Second Special Special
<i>Rhode Island Red.</i> Mrs. O. McKenna, Doagheys, Glasslough, Co. Monaghan.	88	505 506	249 221	2 5	251 226	Special Special
<i>Rhode Island Red.</i> Mrs. M. Smyth, Kilcoon, Dunboyne, Co. Meath.	89	518 520 521 522	172 210 184 172	1 6 35 1	173 216 219 173	Second First Second Second
<i>Buff Rock.</i> Sister-in-Charge, The Technical School, Stradbally, Laoighis.	90	523 524 525 527 528	192 198 243 193 242	14 12 — — 14	206 210 243 193 256	Second Second Special Second Special

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
<i>Buff Rock.</i> Mrs. J. A. Donegan, Blakestown, Ardee, Co. Louth.	91	529 530 531 533	218 184 230 233	1 5 2 4	219 189 232 237	First Second Special Special
<i>Buff Rock.</i> Mrs. M. T. Ffrench, "Poulfaile," New Ross, Co. Wexford.	92	536 537 538	183 222 192	14 21 9	197 243 201	Second Special Second
<i>Buff Rock.</i> Mrs. K. McCabe, Derry, Aughnamullen, Castleblayney, Co. Monaghan.	93	555 556	176 175	16 11	192 186	Second Second
<i>Buff Rock.</i> Mrs. B. McKenna, Gilltown, Navan, Co. Meath.	94	560 562 563	209 200 182	12 5 —	221 205 182	First First Second
<i>Light Sussex.</i> Miss E. Walsh, Ballylemon Lodge, Cappagh, Co. Waterford.	95	566 570	202 181	7 10	209 191	First Second
<i>Barred Rock.</i> Mrs. H. McGowan, Aughavohil, Kinlough, Co. Leitrim.	96	577 579 580	195 183 253	6 9 —	201 192 253	Second Second Special
<i>Barred Rock.</i> Miss B. Power, Slieverue, Butlerstown, Co. Waterford.	97	583 585 586 587 588	201 205 221 183 202	8 12 6 2 1	209 217 227 185 203	First First Special Second First
<i>Barred Rock.</i> Mrs. M. A. Kelly, Carranstown, Ballivor, Co. Meath.	99	597 599	194 228	23 1	217 229	Second Special
<i>Barred Rock.</i> Mrs. E. A. Henderson, Ardrum, Inniscarra, Co. Cork.	100	601 602 603 604 606	204 201 215 183 200	— 2 3 — 5	204 203 218 183 205	First First First Second First
<i>Barred Rock.</i> Miss M. J. Hamilton, New Row, Clonleigh, Lifford, Co. Donegal.	101	609	198	7	205	Second

TABLE XV.

Number and percentage of Pullets of each Breed which qualified for Certificates of Merit.

Breed	Number of Pullets for full Period	Number of Certificates Awarded	Percentage of Pullets awarded Certificates	Percentage Distribution		
				Special	First Class	Second Class
White Wyandotte ..	233	155	66.5	24.1	20.1	22.3
Rhode Island Red ..	172	97	56.4	19.2	11.6	25.6
White Leghorn ..	37	25	67.5	8.1	32.4	27.0
Buff Rock ..	33	15	45.5	12.1	6.1	27.8
Barred Rock ..	34	16	47.0	8.8	20.6	17.6
Light Sussex ..	33	13	39.4	—	15.1	24.3
All Breeds ..	542	321	59.2	18.1	17.1	24.0

In addition to the 321 pullets mentioned in Table XV above, thirteen of the pullets which died during the Test qualified for Certificates, viz. :—

White Wyandotte—1 First and 9 Second Class Certificates.

Rhode Island Red—1 Second Class Certificate.

Buff Rock—1 Special and 1 First Class Certificate.

TABLE XVI.

The following Table gives the number of pullets that died during the Test, and the Cause of death in each case :—

Date of Death	Number of Pullet	Number of Pen	Breed	Cause of Death
1933				
Nov. 7	201	35	Rhode Island Red	Impaction of the gizzard with tough grass.
„ 11	168	29	Rhode Island Red	Peritonitis and inflammation of the oviduct.
Dec. 29	360	63	White Wyandotte	Inflammation of the air sacs.
„ 30	186	32	Rhode Island Red	Degenerative changes in kidneys.
Dec. 30	578	96	Barred Rock	Leukaemia.
1934				
Jan. 3	282	49	White Leghorn	Tapeworm infestation.
„ 12	76	13	White Wyandotte	Inflammation of the oviduct and peritonitis.
„ 15	87	15	White Wyandotte	Peritonitis and inflammation of the oviduct.
„ 19	272	48	White Leghorn	Coccidiosis and intestinal tapeworms.
Feb. 12	568	95	Light Sussex	Pneumonia and heart disease.
Mar. 9	343	61	White Wyandotte	Tuberculosis.
„ 12	53	9	White Wyandotte	Inflammation of the air sacs.
„ 12	308	55	White Wyandotte	Gout.
„ 31	382	67	White Wyandotte	Heart disease consequent on liver cirrhosis.
April 6	342	60	White Wyandotte	Inflammation of the oviduct and peritonitis.
„ 7	69	12	White Wyandotte	Enteritis.
„ 14	270	47	White Leghorn	Gout.
„ 19	627	45	Rhode Island Red	Peritonitis and inflammation of the oviduct.
„ 23	507	88	Rhode Island Red	Tuberculosis.
„ 24	349	62	White Wyandotte	Leukaemia.
„ 30	224	39	Buff Rock	Peritonitis and inflammation of the oviduct.
May 7	70	12	White Wyandotte	Tumours in the kidneys (sarcoma).
„ 16	12	2	White Wyandotte	Chronic peritonitis and impaction of the gizzard with tough grass.
„ 16	431	75	Rhode Island Red	Haemorrhage from rupture of a fatty liver.
„ 17	71	12	White Wyandotte	Enteritis.
„ 17	32	6	White Wyandotte	Gout.
„ 23	352	62	White Wyandotte	Tuberculosis.
„ 25	259	46	White Leghorn	Fowl pox.
May 25	320	57	White Wyandotte	Peritonitis and inflammation of the oviduct.
„ 30	84	14	White Wyandotte	Gout.
June 2	493	86	Rhode Island Red	Tuberculosis and inflammation of the oviduct.
„ 4	396	69	White Wyandotte	Tuberculosis.
„ 6	608	101	Barred Rock	Inflammation of the oviduct.
„ 9	340	60	White Wyandotte	Inflammation of the oviduct.
„ 11	321	57	White Wyandotte	Tuberculosis.
„ 16	134	23	White Wyandotte	Gout.
„ 21	11	2	White Wyandotte	Chronic Coccidiosis.
„ 2	339	60	White Wyandotte	Tumour (sarcoma) over right leg.
„ 9	481	84	Rhode Island Red	Tuberculosis.
July 11	315	56	White Wyandotte	Tuberculosis.

Date of Death	Number of Pullet	Number of Pen	Breed	Cause of Death
July 13	117	20	White Wyandotte	Peritonitis and inflammation of the oviduct.
.. 14	263	46	White Leghorn	Invagination of the small bowel through the cloaca and strangulation of the invaginated bowel.
.. 17	517	89	Rhode Island Red	Peritonitis and inflammation of the oviduct.
.. 25	599	95	Light Sussex	Leukaemia.
.. 28	7	2	White Wyandotte	Chronic Coccidiosis.
.. 30	49	9	White Wyandotte	Enteritis.
Aug. 2	9	2	White Wyandotte	Internal haemorrhage from a liver affected with blood tumours.
.. 2	118	20	White Wyandotte	Gout.
.. 3	248	43	Light Sussex	Tuberculosis.
.. 7	562	94	Buff Rock	Enteritis.
.. 8	8	2	White Wyandotte	Asthenia, or general debility.
.. 8	319	57	White Wyandotte	Peritonitis following inflammation of the oviduct.
.. 8	629	45	Rhode Island Red	Peritonitis following inflammation of the oviduct.
.. 14	358	63	White Wyandotte	Tuberculosis.
.. 16	190	33	Rhode Island Red	Tuberculosis and inflammation of the oviduct.
.. 16	484	84	Rhode Island Red	Tuberculosis.
.. 20	111	19	White Wyandotte	Inflammation of the oviduct.
.. 23	314	56	White Wyandotte	Chronic enteritis.
.. 23	341	60	White Wyandotte	Peritonitis.
.. 24	187	33	Rhode Island Red	Gout.
.. 29	512	72	White Wyandotte	Congestion of the lungs.
.. 30	401	70	White Wyandotte	Peritonitis.
Sept. 7	458	80	Rhode Island Red	Haemorrhage from an ovarian tumour.
.. 10	525	90	Buff Rock ..	Peritonitis and inflammation of the oviduct.

TABLE XVII.

Number and Percentage of Deaths for each Breed.

Breed	Pullets Penned	Number of Deaths	Percentage of Deaths
White Wyandotte .. .	270	37	13.7
Rhode Island Red	186	14	7.5
White Leghorn	42	5	11.9
Buff Rock	36	3	8.3
Barred Rock	36	2	5.5
Light Sussex	36	3	8.3
All Breeds	606	64	10.6

SECTION I.—WHITE WYANDOTTE.—25 PENS.

Order of Merit	NAME AND ADDRESS OF OWNER	Date of Hatching	No. of Pullet	Weight		EGGS LAID										EGGS PER PULLET				Average Weight of Eggs	Total Eggs from Pen.		Number of Hens	Date of Moulting (Neck moult in full)
				On Ar- rival of test	At close of test	Oct. 10-Nov. 6	Nov. 7-Dec. 4	Dec. 5-Jan. 1	Jan. 2-Jan. 9	Jan. 30-Feb. 26	Feb. 27-Mar. 26	Mar. 27-Apr. 23	Apr. 24-May 21	May 22-June 18	June 19-July 16	July 17-Aug. 18	Aug. 14-Sept. 10	Special Grade	First Grade		Second Grade	Total			Price 10-Jan. 9
1	11	Mrs. M. Strong, Moate House, Kells (Ceananus Mor), Co. Meath.	5/3/33 10/3/33 21/2/33 5/3/33 22/3/33	61 62 63 64 65 66	5 8 4 8 4 12 4 14 4 8 4 8	6 0 4 15 4 12 4 11 4 12 4 8	21 21 21 21 21 21 21 21 21 21 21 21	21 21 21 21 21 21 21 21 21 21 21 21	21 21 21 21 21 21 21 21 21 21 21 21	21 21 21 21 21 21 21 21 21 21 21 21	21 21 21 21 21 21 21 21 21 21 21 21	21 21 21 21 21 21 21 21 21 21 21 21	21 21 21 21 21 21 21 21 21 21 21 21	21 21 21 21 21 21 21 21 21 21 21 21	21 21 21 21 21 21 21 21 21 21 21 21	103	145	251	69	25 3/4	3	(a) 1,523 lb. oz. dr. (b) 206 9 7 (c) 200 9 7 (d) 200 9 7 (e) 200 9 7 (f) 200 9 7	1	Aug. Aug. June, June, Aug. May
2	24	Mrs. M. O'Donnell, Porthall, Clontarf, Lifford, Co. Donegal.	5/3/33 " " " " " "	139 140 141 142 143 144	4 10 4 14 4 8 4 9 4 9 4 8	4 12 5 0 4 10 4 9 4 9 4 8	26 21 26 21 26 21 26 21 26 21 26 21	26 21 26 21 26 21 26 21 26 21 26 21	26 21 26 21 26 21 26 21 26 21 26 21	26 21 26 21 26 21 26 21 26 21 26 21	26 21 26 21 26 21 26 21 26 21 26 21	26 21 26 21 26 21 26 21 26 21 26 21	26 21 26 21 26 21 26 21 26 21 26 21	26 21 26 21 26 21 26 21 26 21 26 21	26 21 26 21 26 21 26 21 26 21 26 21	183	37	219	76	24 9	5	(a) 1,282 lb. oz. dr. (b) 176 13 8 (c) 205 5 (d) 205 5 (e) 205 5 (f) 205 5	2	June July Aug. June, Aug. June
8	10	Mr. W. Lawrence, Clontarf P. F., Tullamore, Offaly.	11/3/33 " " " " " "	55 56 57 58 59 60	4 8 4 11 4 11 5 4 5 1 4 8	4 10 5 3 5 3 5 0 4 12 4 9	13 4 26 22 22 13 19 12 22 17 18 21	13 4 26 22 22 13 19 12 22 17 18 21	13 4 26 22 22 13 19 12 22 17 18 21	13 4 26 22 22 13 19 12 22 17 18 21	13 4 26 22 22 13 19 12 22 17 18 21	13 4 26 22 22 13 19 12 22 17 18 21	13 4 26 22 22 13 19 12 22 17 18 21	13 4 26 22 22 13 19 12 22 17 18 21	13 4 26 22 22 13 19 12 22 17 18 21	83	119	199	32	19 10	2	(a) 1,338 lb. oz. dr. (b) 181 15 12 (c) 200 9 7 (d) 200 9 7 (e) 200 9 7 (f) 200 9 7	2	June June, Dec., June, June, June
4	14	Mrs. L. Cox, Victoria Park, Donnybrook, Co. Dublin.	18/3/33 14/3/33 20/3/33 14/3/33 18/3/33	79 80 81 82 83 84	4 13 5 7 5 6 5 3 4 10 4 10	4 15 5 2 5 2 5 3 4 14 4 10	24 21 24 21 24 21 24 21 24 21 24 21	24 21 24 21 24 21 24 21 24 21 24 21	24 21 24 21 24 21 24 21 24 21 24 21	24 21 24 21 24 21 24 21 24 21 24 21	24 21 24 21 24 21 24 21 24 21 24 21	24 21 24 21 24 21 24 21 24 21 24 21	24 21 24 21 24 21 24 21 24 21 24 21	24 21 24 21 24 21 24 21 24 21 24 21	24 21 24 21 24 21 24 21 24 21 24 21	83	131	230	56	24 11 1/2	2	(a) 1,290 lb. oz. dr. (b) 181 8 11 (c) 200 9 7 (d) 200 9 7 (e) 200 9 7 (f) 200 9 7	2	Aug. July June June June June
5	4	Miss E. Powell, Curraghmore House, Borrisokane, Co. Tipperary.	4/2/33 " " " " " "	19 20 21 22 23 24	4 9 4 10 4 9 4 13 5 4 4 9	5 4 6 0 5 6 5 8 6 14 5 2	17 20 17 20 17 20 17 20 17 20 17 20	17 20 17 20 17 20 17 20 17 20 17 20	17 20 17 20 17 20 17 20 17 20 17 20	17 20 17 20 17 20 17 20 17 20 17 20	17 20 17 20 17 20 17 20 17 20 17 20	17 20 17 20 17 20 17 20 17 20 17 20	17 20 17 20 17 20 17 20 17 20 17 20	17 20 17 20 17 20 17 20 17 20 17 20	17 20 17 20 17 20 17 20 17 20 17 20	183	12	213	60	23 5	6	(a) 1,267 lb. oz. dr. (b) 178 6 7 (c) 200 9 7 (d) 200 9 7 (e) 200 9 7 (f) 200 9 7	6	June, Aug. June, Aug. June, Aug. June, Aug. June, Aug. June

SECTION I.—WHITE WYANDOTTES.—continued.

Order of Merit	NAME AND ADDRESS OF OWNER	Date of Hatching	No. of Pullet	WEIGHT		EGGS LAID												EGGS PER PULLET				Average Weight of Eggs	Total Regs. from Pen.		Bills under Prescribed Weight	Number of times Broody	Date of Moulting. (Neck moult in italics)	
				On Ar- rival.	At close of test	Jan. 2-Jan. 20	Jan. 20-Feb. 20	Feb. 27-Mar. 20	Mar. 27-Apr. 20	Apr. 24-May 21	May 22-June 19	June 19-July 16	July 17-Aug. 13	Aug. 14-Sept. 10	Special Grade	First Grade	Second Grade	Total	First Grade + Oct. 10-Jan. 9	Value per Pullet								
11	18	Mr. D. J. MacArthur, Brennontown, Lancaster, Trim, Co. Meath.	Feb. '33	103	5 4	4 15	5	5	16	19	23	24	26	11	10	14	31	130	17	147	26	1	(a) 1,198 Dr. oz. dr.	(b) 161 13 11	(c) 26.4	(d) 16 8 22	1	Nov., June July, Aug. July, Aug. Dec., June July, Aug.
12	23	Mrs. N. McElligott, Bedford, Co. Kerry.	4/4/33	133	4 8	4 11	28	23	30	31	20	30	19	14	16	10	31	124	65	11	22	8	(a) 1,225 Dr. oz. dr.	(b) 165 15 14	(c) 25.8	(d) 16 6 7	3	June June June Oct., July
13	10	Miss P. Brady, Newtownswilly, Cearmans Moor, Co. Meath.	18/2/33	91	4 11	5 4	24	19	21	21	19	21	18	14	7	12	23	47	133	11	30	32	(a) 1,177 Dr. oz. dr.	(b) 156 14 1	(c) 25.4	(d) 16 6 1	3	Aug. Aug. Aug. Aug.
14	8	Mrs. E. M. O'Hara, Merrion, Crookstown, Co. Westmeath.	21/3/33	13	5 14	4 0	18	20	19	18	14	18	17	19	20	16	10	18	136	5	212	37	(a) 1,100 Dr. oz. dr.	(b) 154 11 3	(c) 25.1	(d) 16 1 5 1/2	5	Aug., July Aug., July June June Aug.
15	17	Rev. Bro. F. Peggitt, Our Lady of Lourdes, Cahernacloy, Ardagh, Co. Limerick.	25/2/33	97	5 8	5 1	14	20	16	8	21	21	21	16	15	21	8	28	129	10	186	34	(a) 1,219 Dr. oz. dr.	(b) 167 7 10	(c) 26.3	(d) 16 3 1 1/2	1	July, Aug. June, Aug. Oct., June July Oct., June Aug. Nov., June June

D.=Dead.

SECTION I.—WHITE WYANDOTTE—continued.

Order of Merit	Number of Pen	NAME AND ADDRESS OF OWNER	Date of Hatching	WEIGHT		EGGS LAID								EGGS PER PULLET			Value per Pullet Oct. 10-Jan. 9	Average Weight of Eggs per Pullet	(a) Total Eggs from Pen.				Bugs under Prescribed Weight	Number of times Broody	Date of Moulting (New feathers in italics)
				On arrival	At close of test	Oct. 10-Nov. 6	Nov. 7-Dec. 4	Dec. 5-Jan. 1	Jan. 2-Jan. 29	Jan. 30-Feb. 26	Feb. 27-Mar. 26	Mar. 27-Apr. 23	Apr. 24-May 31	May 32-June 18	June 19-July 16	July 17-Aug. 13	Aug. 14-Sept. 10								
†	10	Mrs. M. Deegan, Roadside P. I., Lodge Park, Fresford, Co. Kilkenny.	March	7 5 7	D	21 19 17	17 17 17	17 17 17	17 17 17	17 17 17	17 17 17	17 17 17	17 17 17	17 17 17	17 17 17	17 17 17	17 17 17	17 17 17	(a) 913	(b) 115	(c) 0	(d) 0	1	1	May
			"	9 5 6	D	23 23 23	23 23 23	23 23 23	23 23 23	23 23 23	23 23 23	23 23 23	23 23 23	23 23 23	23 23 23	23 23 23	23 23 23	23 23 23	(a) 115	(b) 115	(c) 0	(d) 0	1	2	May
			"	10 4 11	3 2	23 23 23	23 23 23	23 23 23	23 23 23	23 23 23	23 23 23	23 23 23	23 23 23	23 23 23	23 23 23	23 23 23	23 23 23	23 23 23	(a) 115	(b) 115	(c) 0	(d) 0	1	1	July
			"	12 4 8	D	23 23 23	23 23 23	23 23 23	23 23 23	23 23 23	23 23 23	23 23 23	23 23 23	23 23 23	23 23 23	23 23 23	23 23 23	23 23 23	(a) 24.2	(b) 115	(c) 0	(d) 0	1	1	Feb.
			"	U.I.	D	23 23 23	23 23 23	23 23 23	23 23 23	23 23 23	23 23 23	23 23 23	23 23 23	23 23 23	23 23 23	23 23 23	23 23 23	23 23 23	(a) 115	(b) 115	(c) 0	(d) 0	1	1	—
†	13	Mr. W. Frazer, Twigs Park, Maorihauilton, Co. Leitrim.	11/3/33	73 5 4	6 7	20 20 20	20 20 20	20 20 20	20 20 20	20 20 20	20 20 20	20 20 20	20 20 20	20 20 20	20 20 20	20 20 20	20 20 20	20 20 20	(a) 971	(b) 135	(c) 0	(d) 0	1	1	Dec., Jan., Aug.
			"	74 4 9	5 8	17 17 17	17 17 17	17 17 17	17 17 17	17 17 17	17 17 17	17 17 17	17 17 17	17 17 17	17 17 17	17 17 17	17 17 17	17 17 17	(b) 135	(c) 0	(d) 0	(d) 0	3	3	June
			"	75 5 5	5 9	21 21 21	21 21 21	21 21 21	21 21 21	21 21 21	21 21 21	21 21 21	21 21 21	21 21 21	21 21 21	21 21 21	21 21 21	21 21 21	(b) 135	(c) 0	(d) 0	(d) 0	7	7	July
			11/3/33	76 5 5	5 14	11 7	11 7	11 7	11 7	11 7	11 7	11 7	11 7	11 7	11 7	11 7	11 7	11 7	(b) 135	(c) 0	(d) 0	(d) 0	6	6	June
			11/3/33	78 4 8	4 15	11 7	11 7	11 7	11 7	11 7	11 7	11 7	11 7	11 7	11 7	11 7	11 7	11 7	(b) 135	(c) 0	(d) 0	(d) 0	6	6	—
†	9	Mrs. P. Connolly, Carrigmore, Co. Monaghan.	February	49 4 11	D	21 23 21	21 23 21	21 23 21	21 23 21	21 23 21	21 23 21	21 23 21	21 23 21	21 23 21	21 23 21	21 23 21	21 23 21	21 23 21	(a) 705	(b) 107	(c) 0	(d) 0	1	1	June, Aug.
			"	50 4 12	5 10	7 9	7 9	7 9	7 9	7 9	7 9	7 9	7 9	7 9	7 9	7 9	7 9	7 9	(b) 107	(c) 0	(d) 0	(d) 0	3	3	June, Aug.
			"	51 4 12	5 4	16 16 16	16 16 16	16 16 16	16 16 16	16 16 16	16 16 16	16 16 16	16 16 16	16 16 16	16 16 16	16 16 16	16 16 16	16 16 16	(b) 107	(c) 0	(d) 0	(d) 0	7	7	July
			March	52 4 8	D	20 20 20	20 20 20	20 20 20	20 20 20	20 20 20	20 20 20	20 20 20	20 20 20	20 20 20	20 20 20	20 20 20	20 20 20	20 20 20	(b) 107	(c) 0	(d) 0	(d) 0	6	6	—
			"	53 4 8	4 12	18 17 18	17 18 18	17 18 18	17 18 18	17 18 18	17 18 18	17 18 18	17 18 18	17 18 18	17 18 18	17 18 18	17 18 18	17 18 18	(b) 107	(c) 0	(d) 0	(d) 0	1	1	—
†	5	Mrs. M. Sheehy, Ballynahill, Co. Limerick.	March	25 5 0	6 4	—	—	—	—	—	—	—	—	—	—	—	—	—	(a) 888	(b) 116	(c) 0	(d) 0	1	1	Oct., June
			"	26 5 6	6 8	—	—	—	—	—	—	—	—	—	—	—	—	—	(b) 116	(c) 0	(d) 0	(d) 0	1	1	June, Aug.
			"	27 4 12	4 14	15 17 17	17 17 17	17 17 17	17 17 17	17 17 17	17 17 17	17 17 17	17 17 17	17 17 17	17 17 17	17 17 17	17 17 17	17 17 17	(b) 116	(c) 0	(d) 0	(d) 0	1	1	June
			"	28 5 0	6 2	23 18 17	18 17 18	18 17 18	18 17 18	18 17 18	18 17 18	18 17 18	18 17 18	18 17 18	18 17 18	18 17 18	18 17 18	18 17 18	(b) 116	(c) 0	(d) 0	(d) 0	1	1	June, Aug.
			"	29 5 0	5 5	19 17 17	17 17 17	17 17 17	17 17 17	17 17 17	17 17 17	17 17 17	17 17 17	17 17 17	17 17 17	17 17 17	17 17 17	17 17 17	(b) 116	(c) 0	(d) 0	(d) 0	1	1	June, July
†	12	Mrs. R. Craige, Harristown House, St. Margaret's, Co. Dublin.	—	67 4 15	4 12	20 22 22	22 22 22	22 22 22	22 22 22	22 22 22	22 22 22	22 22 22	22 22 22	22 22 22	22 22 22	22 22 22	22 22 22	22 22 22	(a) 777	(b) 97	(c) 0	(d) 0	1	1	June, July
			—	68 4 8	5 8	21 22 22	22 22 22	22 22 22	22 22 22	22 22 22	22 22 22	22 22 22	22 22 22	22 22 22	22 22 22	22 22 22	22 22 22	22 22 22	(b) 99	(c) 0	(d) 0	(d) 0	1	1	Oct.
			—	69 4 10	D	18 16 20	16 18 16	16 18 16	16 18 16	16 18 16	16 18 16	16 18 16	16 18 16	16 18 16	16 18 16	16 18 16	16 18 16	16 18 16	(b) 99	(c) 0	(d) 0	(d) 0	1	1	—
			—	70 5 0	D	18 16 20	16 18 16	16 18 16	16 18 16	16 18 16	16 18 16	16 18 16	16 18 16	16 18 16	16 18 16	16 18 16	16 18 16	16 18 16	(b) 99	(c) 0	(d) 0	(d) 0	1	1	—
			—	72 5 4	6 6	13 20 12	13 16 13	16 13 16	16 13 16	16 13 16	16 13 16	16 13 16	16 13 16	16 13 16	16 13 16	16 13 16	16 13 16	16 13 16	(b) 99	(c) 0	(d) 0	(d) 0	1	1	June

U.T. = Untrapped.

D. = Dead.

† Disqualified under Clause 25 (pen produced less than 1,020 eggs).

* Disqualified under Clause 25 (more than 20 per cent. second grade eggs).

[illegible]D. ~~is~~ Dead

SECTION II.—ANY SITTING BREED OTHER THAN WHITE WYANDOTTE—continued

Order of Merit	Number of Pen	NAME AND ADDRESS OF OWNER	Date of Hatching	No. of Pullet	Weight		EGGS LAID										EGGS PER PULLET				Average Weight of Eggs per Pullet	(a) Total Eggs from Pen.			Eggs under Prescribed Weight	Number of times Broody	Date of Moulting (Neck moults in italics)
					On Ar- rival of Feb.	At close of Feb.	Oct. 10-Nov. 9	Nov. 7-Dec. 4	Dec. 3-Jan. 1	Jan. 2-Jan. 29	Jan. 30-Feb. 26	Feb. 27-Mar. 26	Mar. 27-Apr. 23	Apr. 24-May 21	May 22-June 18	June 19-July 16	July 17-Aug. 13	Aug. 14-Sept. 10	Special Grade	First Grade		Second Grade	Total	First Grade— Oct. 10-Jan. 9			
6	34	<i>Rhode Island Red.</i> Mrs. M. Danaher P. F., Nenagh, Co. Tipperary.	1033 March	193	5 3	5 9	7 20	10 15	11 13	14 17	17 19	19 21	21 23	23 25	25 27	27 29	29 31	31 33	90	132	1	223	58	25 3	40	—	Aug.
			"	194	5 15	6 10	7 15	10 16	11 13	14 17	17 19	19 21	21 23	23 25	25 27	27 29	29 31	31 33	100	136	6	198	32	19 7	42	—	July
			"	195	5 5	5 8	7 10	10 15	11 13	14 17	17 19	19 21	21 23	23 25	25 27	27 29	29 31	31 33	100	135	6	198	32	19 7	42	—	Aug.
			"	196	5 7	6 0	7 2	10 15	11 13	14 17	17 19	19 21	21 23	23 25	25 27	27 29	29 31	31 33	100	135	6	198	32	19 7	42	—	July
			"	197	7 3	7 2	10 15	11 13	14 17	17 19	19 21	21 23	23 25	25 27	27 29	29 31	31 33	100	135	6	198	32	19 7	42	—	Aug.	
			"	198	5 1	4 12	7 20	10 15	11 13	14 17	17 19	19 21	21 23	23 25	25 27	27 29	29 31	31 33	100	135	6	198	32	19 7	42	—	Aug.
7	35	<i>Rhode Island Red.</i> Mrs. M. G. King, Beech Grove, Donadara, Co. Kildare.	27/2/33	199	5 0	5 5	7 20	10 15	11 13	14 17	17 19	19 21	21 23	23 25	25 27	27 29	29 31	31 33	90	132	1	225	64	24 10	22	—	Aug.
			"	200	5 1	5 0	7 15	10 16	11 13	14 17	17 19	19 21	21 23	23 25	25 27	27 29	29 31	31 33	100	134	8	212	36	19 7	42	—	June
			"	201	5 1	5 12	7 10	10 15	11 13	14 17	17 19	19 21	21 23	23 25	25 27	27 29	29 31	31 33	100	134	8	212	36	19 7	42	—	Aug.
			"	202	5 0	5 10	7 15	10 16	11 13	14 17	17 19	19 21	21 23	23 25	25 27	27 29	29 31	31 33	100	134	8	212	36	19 7	42	—	Aug.
			"	203	5 0	5 10	7 15	10 16	11 13	14 17	17 19	19 21	21 23	23 25	25 27	27 29	29 31	31 33	100	134	8	212	36	19 7	42	—	Aug.
			"	204	4 13	5 0	7 20	10 15	11 13	14 17	17 19	19 21	21 23	23 25	25 27	27 29	29 31	31 33	100	134	8	212	36	19 7	42	—	Aug.
8	20	<i>Rhode Island Red.</i> Mrs. F. Gleeson, Tinarum, Kilbarron, Co. Clare.	22/3/33	145	5 5	5 10	7 20	10 15	11 13	14 17	17 19	19 21	21 23	23 25	25 27	27 29	29 31	31 33	7	145	38	190	29	20 34	22	—	July
			"	146	5 10	4 12	7 15	10 16	11 13	14 17	17 19	19 21	21 23	23 25	25 27	27 29	29 31	31 33	7	145	38	190	29	20 34	22	—	Aug.
			"	147	5 10	5 35	7 15	10 16	11 13	14 17	17 19	19 21	21 23	23 25	25 27	27 29	29 31	31 33	7	145	38	190	29	20 34	22	—	July
			"	148	5 6	5 10	7 15	10 16	11 13	14 17	17 19	19 21	21 23	23 25	25 27	27 29	29 31	31 33	7	145	38	190	29	20 34	22	—	July
			"	149	5 11	5 15	7 15	10 16	11 13	14 17	17 19	19 21	21 23	23 25	25 27	27 29	29 31	31 33	7	145	38	190	29	20 34	22	—	July
9	37	<i>Rhode Island Red.</i> Mrs. M. A. Miller, Millview, Lenamore, Co. Longford.	25/2/33	211	4 9	5 4	7 20	10 15	11 13	14 17	17 19	19 21	21 23	23 25	25 27	27 29	29 31	31 33	7	145	38	190	29	20 34	22	—	Oct., July
			"	212	4 10	5 7	7 15	10 16	11 13	14 17	17 19	19 21	21 23	23 25	25 27	27 29	29 31	31 33	7	145	38	190	29	20 34	22	—	July
			"	213	5 6	5 7	7 10	10 15	11 13	14 17	17 19	19 21	21 23	23 25	25 27	27 29	29 31	31 33	7	145	38	190	29	20 34	22	—	Dec., July
			25/2/33	214	4 11	5 12	7 10	10 15	11 13	14 17	17 19	19 21	21 23	23 25	25 27	27 29	29 31	31 33	7	145	38	190	29	20 34	22	—	July
			"	215	4 8	5 11	7 10	10 15	11 13	14 17	17 19	19 21	21 23	23 25	25 27	27 29	29 31	31 33	7	145	38	190	29	20 34	22	—	Feb., Aug.
10	45	<i>Rhode Island Red.</i> Mrs. B. Rafter, Knockthomas, Nurney, Bagenalstown, Co. Carlow.	29/2/33	625	5 2	6 15	7 20	10 15	11 13	14 17	17 19	19 21	21 23	23 25	25 27	27 29	29 31	31 33	149	138	1	297	38	20 11	24	—	Oct., July
			"	626	4 8	4 6	7 15	10 16	11 13	14 17	17 19	19 21	21 23	23 25	25 27	27 29	29 31	31 33	149	138	1	297	38	20 11	24	—	Aug.
			"	627	6 4	5 1	7 10	10 15	11 13	14 17	17 19	19 21	21 23	23 25	25 27	27 29	29 31	31 33	149	138	1	297	38	20 11	24	—	Aug.
			"	628	4 9	4 7	7 10	10 15	11 13	14 17	17 19	19 21	21 23	23 25	25 27	27 29	29 31	31 33	149	138	1	297	38	20 11	24	—	Oct., July
			"	629	4 8	5 2	7 10	10 15	11 13	14 17	17 19	19 21	21 23	23 25	25 27	27 29	29 31	31 33	149	138	1	297	38	20 11	24	—	July

SECTION II.—ANY SITTING BRED OTHER THAN WHITE WYANDOTTE—continued.

Order of Merit	Number of Pen	NAME AND ADDRESS OF OWNER	Date of Hatching	No. of Pullets	WEIGHT		EGGS LAID										EGGS PER PULLET				Average Weight of Eggs per Pullet	(a) Total Eggs from Pen.				Bred under Weight	Number of times Broody	Date of Moulting (Neck moult in Italics)
					On arrival of test	At close of test	Oct. 10-Nov. 6	Nov. 7-Dec. 4	Dec. 5-Jan. 1	Jan. 2-Jan. 20	Jan. 20-Feb. 20	Feb. 27-Mar. 20	Mar. 27-Apr. 23	Apr. 24-May 21	May 22-June 10	June 10-July 10	July 17-Aug. 18	Aug. 14-Sept. 10	Special Grade	First Grade		Second Grade	Total	First Grade—Oct. 10-Jan. 8	Total weight.				Total value from Pen.	Av. Weight per dozen.	Total value from Pen.
†	42	<i>Light Sussex.</i> Rev. J. R. O'Rourke, Black Lion P. F., Blue Ball, Tullamore, Offaly.	1933 February April January April January	241 242 243 244 245 246	5 12 5 13 5 18 5 9 5 8 5 8	0 8 0 8 0 5 0 7 0 2 0 2	15 21 15 22 15 25 15 23 15 23 15 23	21 24 21 25 21 26 21 27 21 28 21 28	23 24 23 25 23 26 23 27 23 28 23 28	25 26 25 27 25 28 25 29 25 30 25 30	27 28 27 29 27 30 27 31 27 32 27 32	29 30 29 31 29 32 29 33 29 34 29 34	31 32 31 33 31 34 31 35 31 36 31 36	33 34 33 35 33 36 33 37 33 38 33 38	35 36 35 37 35 38 35 39 35 40 35 40	37 38 37 39 37 40 37 41 37 42 37 42	39 40 39 41 39 42 39 43 39 44 39 44	41 42 41 43 41 44 41 45 41 46 41 46	142 143 144 145 146 146	50 51 52 53 54 54	(a) 1,002 b. oz. dr. (b) 139 12 3 c. oz. (c) 26.8 (d) 5.12 5	— — — — — —	5 3 3 3 4 4	Jan., June Aug. July July July Oct., Aug.				
*	29	<i>Rhode Island Red.</i> Miss D. Strong, Mills House, Kells (Ceanannus Mor), Co. Meath.	28/1/33 February 11/7/33 26/2/33 3/2/33	103 104 105 106 107 108	4 14 4 14 4 10 4 10 4 12 5 0	5 6 5 6 4 12 4 12 5 8 D	23 23 23 23 23 25 23 23 23 23 23 23	25 26 25 27 25 28 25 29 25 30 25 30	27 28 27 29 27 30 27 31 27 32 27 32	29 30 29 31 29 32 29 33 29 34 29 34	31 32 31 33 31 34 31 35 31 36 31 36	33 34 33 35 33 36 33 37 33 38 33 38	35 36 35 37 35 38 35 39 35 40 35 40	37 38 37 39 37 40 37 41 37 42 37 42	39 40 39 41 39 42 39 43 39 44 39 44	41 42 41 43 41 44 41 45 41 46 41 46	43 44 43 45 43 46 43 47 43 48 43 48	250 251 252 253 254 254	43 44 45 46 47 47	(a) 1,105 b. oz. dr. (b) 141 4 13 c. oz. (c) 24.5 (d) 5.11 6½	1 1 1 1 1 1	1 1 1 1 1 1	Aug. Aug. June June June June					
11	44	<i>Light Sussex.</i> Miss D. M. Pice, Rossmore, New Ross, Co. Wexford.	10/3/33 " " " " " " " "	253 254 255 256 257 258	5 8 5 8 5 10 5 10 5 12 5 9	5 2 5 2 5 5 5 5 5 0 5 8	23 23 23 24 23 25 23 26 23 26 23 26	25 26 25 27 25 28 25 29 25 30 25 30	27 28 27 29 27 30 27 31 27 32 27 32	29 30 29 31 29 32 29 33 29 34 29 34	31 32 31 33 31 34 31 35 31 36 31 36	33 34 33 35 33 36 33 37 33 38 33 38	35 36 35 37 35 38 35 39 35 40 35 40	37 38 37 39 37 40 37 41 37 42 37 42	39 40 39 41 39 42 39 43 39 44 39 44	41 42 41 43 41 44 41 45 41 46 41 46	43 44 43 45 43 46 43 47 43 48 43 48	270 271 272 273 274 274	38 39 40 41 42 42	(a) 1,030 b. oz. dr. (b) 131 3 9 c. oz. (c) 24.8 (d) 5.9 6½	1 1 1 1 1 1	1 1 1 1 1 1	Aug. Aug. Oct., July Oct., July July July					
12	28	<i>Rhode Island Red.</i> Mrs. L. V. Lane Allman, Woodlands, Bandon, Co. Cork.	20/3/33 " " " " " " " "	157 158 159 160 161 162	5 3 5 8 5 13 5 13 4 15 4 15	5 7 5 6 5 6 5 6 5 4 5 4	19 20 19 21 19 22 19 23 19 24 19 24	21 22 21 23 21 24 21 25 21 26 21 26	23 24 23 25 23 26 23 27 23 28 23 28	25 26 25 27 25 28 25 29 25 30 25 30	27 28 27 29 27 30 27 31 27 32 27 32	29 30 29 31 29 32 29 33 29 34 29 34	31 32 31 33 31 34 31 35 31 36 31 36	33 34 33 35 33 36 33 37 33 38 33 38	35 36 35 37 35 38 35 39 35 40 35 40	37 38 37 39 37 40 37 41 37 42 37 42	39 40 39 41 39 42 39 43 39 44 39 44	127 128 129 130 131 131	8 9 10 11 12 12	(a) 1,002 b. oz. dr. (b) 142 14 8 c. oz. (c) 25.1 (d) 5.6 10½	— 3 3 3 1 1	— — — — — —	June Aug. July Aug. Aug. Aug.					
*	39	<i>Buff Rock.</i> Mrs. C. E. Jeffers, Drumleck, Castledellingham, Co. Louth.	28/2/33 20/3/33 30/3/33 29/2/33 30/3/33	223 224 225 226 227 228	5 2 5 0 5 0 5 2 5 2 5 2	4 12 D 5 0 6 4 6 4 6 15	20 20 20 21 20 22 20 23 20 24 20 25	22 23 22 24 22 25 22 26 22 27 22 27	24 25 24 26 24 27 24 28 24 29 24 29	26 27 26 28 26 29 26 30 26 31 26 31	28 29 28 30 28 31 28 32 28 33 28 33	30 31 30 32 30 33 30 34 30 35 30 35	32 33 32 34 32 35 32 36 32 37 32 37	34 35 34 36 34 37 34 38 34 39 34 39	36 37 36 38 36 39 36 40 36 41 36 41	38 39 38 40 38 41 38 42 38 43 38 43	196 197 198 199 200 200	7 8 9 10 11 11	(a) 1,122 b. oz. dr. (b) 141 8 0 c. oz. (c) 21.2 (d) 5.3 8½	— 2 — — 30 1	3 — — — — 1	July Aug. July Aug. Aug. Aug.						

† Disqualified under Clause 26 (pen produced less than 1,020 eggs.)

* Disqualified under Clause 25 (more than 20 per cent. second grade eggs.)

D = Dead.

SECTION II.—ANY SITTING BREED OTHER THAN WHITE WYANDOTTIC—continued

Order of Merit	Number of Pen	NAME AND ADDRESS OF OWNER	Date of Hatching	No. of Pullet	WEIGHT		EGGS LAID										EGGS PER PULLET				Average Weight of Eggs Per Pullet or Total value from Pen.	(a) Total Eggs from Pen.	(b) Total weight, dr.	(c) Av. Weight per dozen.	(d) Total value from Pen.	Eggs under Prescribed Weight	Number of times Broody	Date of Moulting (Neck moult in italics)
					On At-rival	At close of test	Oct. 10-Nov. 6	Nov. 7-Dec. 4	Dec. 5-Jan. 1	Jan. 2-Jan. 19	Jan. 20-Feb. 13	Feb. 14-Mar. 26	Mar. 27-Apr. 23	Apr. 24-May 21	May 22-June 13	June 14-July 16	July 17-Aug. 13	Aug. 14-Sept. 10	Special Grade	First Grade	Second Grade	Total	First Grade—Oct. 10-Jan. 9					
†	90	Rhode Island Red. Mrs. J. Kirkwood, Derryenne, Dromed, Co. Leitrim.	1933 March	169	5 1	4 4	20 16	16 16	16 16	16 16	17 21	21 21	21 18	24 24	24 13	17 17	17 17	21 10	7	86	26	147	17 15	17 15	(a) 924 (b) 121 12 (c) 25.3 (d) 24 14 64	1	3	Aug. July
			"	170	5 8	5 6	18 19	18 19	18 19	18 19	18 19	18 19	18 19	18 19	18 19	18 19	18 19	18 19	7	86	26	147	17 15	17 15	(a) 924 (b) 121 12 (c) 25.3 (d) 24 14 64	1	3	Aug. July
			"	171	4 13	5 8	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	7	86	26	147	17 15	17 15	(a) 924 (b) 121 12 (c) 25.3 (d) 24 14 64	1	3	Aug. July
			"	172	4 12	5 8	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	7	86	26	147	17 15	17 15	(a) 924 (b) 121 12 (c) 25.3 (d) 24 14 64	1	3	Aug. July
			"	173	5 10	5 14	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	7	86	26	147	17 15	17 15	(a) 924 (b) 121 12 (c) 25.3 (d) 24 14 64	1	3	Aug. July
†	36	Rhode Island Red. Mrs. L. Hurley, Belmont, Colb., Co. Cork.	1933 March	205	5 7	5 10	13 17	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	94	81	1	176	35 17	35 17	(a) 1,016 (b) 132 11 (c) 25.1 (d) 24 11 104	4	1	July
			"	206	4 10	4 12	13 17	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	94	81	1	176	35 17	35 17	(a) 1,016 (b) 132 11 (c) 25.1 (d) 24 11 104	4	1	July
			"	207	4 11	4 14	13 17	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	94	81	1	176	35 17	35 17	(a) 1,016 (b) 132 11 (c) 25.1 (d) 24 11 104	4	1	July
			"	208	5 0	4 14	13 17	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	94	81	1	176	35 17	35 17	(a) 1,016 (b) 132 11 (c) 25.1 (d) 24 11 104	4	1	July
			"	210	4 10	4 12	13 17	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	94	81	1	176	35 17	35 17	(a) 1,016 (b) 132 11 (c) 25.1 (d) 24 11 104	4	1	July
*†	43	Light Sussex. Mrs. E. J. Percival, The Grange House, Barnham, Co. Sligo.	31/1/33	247	5 4	5 12	20 11	20 11	20 11	20 11	20 11	20 11	20 11	20 11	20 11	20 11	20 11	20 11	85	78	27	157	12 8	12 8	(a) 854 (b) 108 15 (c) 24.5 (d) 24 0 3	2	4	Oct., Aug.
			"	248	5 14	5 10	20 11	20 11	20 11	20 11	20 11	20 11	20 11	20 11	20 11	20 11	20 11	20 11	85	78	27	157	12 8	12 8	(a) 854 (b) 108 15 (c) 24.5 (d) 24 0 3	2	4	Oct., Aug.
			"	249	5 8	4 9	25 13	25 13	25 13	25 13	25 13	25 13	25 13	25 13	25 13	25 13	25 13	25 13	85	78	27	157	12 8	12 8	(a) 854 (b) 108 15 (c) 24.5 (d) 24 0 3	2	4	Oct., Aug.
			"	250	5 8	4 9	25 13	25 13	25 13	25 13	25 13	25 13	25 13	25 13	25 13	25 13	25 13	25 13	85	78	27	157	12 8	12 8	(a) 854 (b) 108 15 (c) 24.5 (d) 24 0 3	2	4	Oct., Aug.
			"	251	5 11	5 14	21 17	21 17	21 17	21 17	21 17	21 17	21 17	21 17	21 17	21 17	21 17	21 17	85	78	27	157	12 8	12 8	(a) 854 (b) 108 15 (c) 24.5 (d) 24 0 3	2	4	Oct., Aug.
†	82	Rhode Island Red. Miss A. D. Maude, The Lodge, Glendalough, Co. Wicklow.	1933 March	181	5 6	6 2	17 23	17 23	17 23	17 23	17 23	17 23	17 23	17 23	17 23	17 23	17 23	17 23	123	89	45	217	38 22	38 22	(a) 752 (b) 102 8 (c) 26.2 (d) 23 12 74	4	4	Aug. June
			"	182	5 13	5 4	17 23	17 23	17 23	17 23	17 23	17 23	17 23	17 23	17 23	17 23	17 23	17 23	123	89	45	217	38 22	38 22	(a) 752 (b) 102 8 (c) 26.2 (d) 23 12 74	4	4	Aug. June
			"	183	5 16	5 8	15 12	15 12	15 12	15 12	15 12	15 12	15 12	15 12	15 12	15 12	15 12	15 12	123	89	45	217	38 22	38 22	(a) 752 (b) 102 8 (c) 26.2 (d) 23 12 74	4	4	Aug. June
			"	184	5 9	6 4	16 8	16 8	16 8	16 8	16 8	16 8	16 8	16 8	16 8	16 8	16 8	16 8	123	89	45	217	38 22	38 22	(a) 752 (b) 102 8 (c) 26.2 (d) 23 12 74	4	4	Aug. June
			"	185	4 8	D	16 8	16 8	16 8	16 8	16 8	16 8	16 8	16 8	16 8	16 8	16 8	16 8	123	89	45	217	38 22	38 22	(a) 752 (b) 102 8 (c) 26.2 (d) 23 12 74	4	4	Aug. June
†	41	Light Sussex. Mr. F. S. Browne, Eastdown, Bagenstown, Co. Carlow.	21/2/33	235	6 6	5 7	16 13	16 13	16 13	16 13	16 13	16 13	16 13	16 13	16 13	16 13	16 13	16 13	128	4	—	132	34 15	34 15	(a) 758 (b) 112 11 (c) 28.5 (d) 23 9 10	—	3	Oct., Aug.
			"	236	5 13	5 8	16 13	16 13	16 13	16 13	16 13	16 13	16 13	16 13	16 13	16 13	16 13	16 13	128	4	—	132	34 15	34 15	(a) 758 (b) 112 11 (c) 28.5 (d) 23 9 10	—	3	Oct., Aug.
			"	237	6 12	6 4	16 13	16 13	16 13	16 13	16 13	16 13	16 13	16 13	16 13	16 13	16 13	16 13	128	4	—	132	34 15	34 15	(a) 758 (b) 112 11 (c) 28.5 (d) 23 9 10	—	3	Oct., Aug.
			"	238	5 15	5 8	16 13	16 13	16 13	16 13	16 13	16 13	16 13	16 13	16 13	16 13	16 13	16 13	128	4	—	132	34 15	34 15	(a) 758 (b) 112 11 (c) 28.5 (d) 23 9 10	—	3	Oct., Aug.
			"	239	5 15	5 8	16 13	16 13	16 13	16 13	16 13	16 13	16 13	16 13	16 13	16 13	16 13	16 13	128	4	—	132	34 15	34 15	(a) 758 (b) 112 11 (c) 28.5 (d) 23 9 10	—	3	Oct., Aug.

† Disqualified under Clause 25 (pen produced less than 1,020 eggs).

* Disqualified under Clause 25 (more than 20 per cent. second grade eggs).

D. = Dead.

SECTION III.—ANY NON-SITTING BREED—continued.

Order of Merit	Number of Pen	NAME AND ADDRESS OF OWNER	Date of Hatching	No. of Pullets	WEIGHT		EGGS LAID										EGGS PER PULLET				Value per Pullet	Average Weight of Eggs per Pullet	(a) Total Eggs from Pen.				Eggs under Prescribed Weight	Number of times Broody	Date of Moulting (Neck moult in italics)	
					On rival of Test	At close of Test	Oct. 10-Nov. 6	Nov. 7-Dec. 1	Dec. 2-Jan. 1	Jan. 2-Jan. 20	Jan. 20-Feb. 20	Feb. 20-Mar. 20	Mar. 20-Apr. 20	Apr. 20-May 20	May 20-June 18	June 18-July 10	July 10-Aug. 18	Aug. 18-Sept. 10	Special Grade	First Grade			Second Grade	Total	First Grade—Oct. 10-Jan. 9	(b) Total weight.				(c) Av. Weight per dozen.	(d) Total value from Pen.
†	52	White Lechorn, Mrs. W. A. Walsh, Wardstown, Athboy, Co. Meath.	29/3/33 1/4/33 29/3/33 "	613	3 15	4 7	7 7	11 22	15 22	19 13	20 20	22 11	23 19	25 19	27 19	29 16	31 16	32 16	18	31	1	113	31	31	11	101	11	4	4	Jan., May
				614	3 12	4 4	7 7	11 17	15 17	19 13	20 20	22 11	23 19	25 19	27 19	29 16	31 16	32 16	10	36	3	265	31	31	11	101	11	4	4	Aug.
				615	3 8	3 8	7 7	11 17	15 17	19 13	20 20	22 11	23 19	25 19	27 19	29 16	31 16	32 16	10	36	3	199	31	31	11	101	11	4	4	June
				617	3 12	4 4	7 7	11 17	15 17	19 13	20 20	22 11	23 19	25 19	27 19	29 16	31 16	32 16	10	36	3	199	31	31	11	101	11	4	4	July, Aug.
†	49	White Lechorn, Mrs. M. E. Shanley, Dromard, Dromod, Co. Leitrim.	25/3/33 4/3/33 " " 25/3/33	277	4 4	5 0	11 18	15 18	19 13	20 20	22 11	23 19	25 19	27 19	29 16	31 16	32 16	10	5	5	189	32	32	18	77	9	9	9	July, Aug.	
				278	3 9	4 5	16 17	20 20	22 11	23 19	25 19	27 19	29 16	31 16	32 16	34 18	36 18	37 18	1	96	3	79	30	30	15	11	11	11	11	Aug.
				279	4 5	4 0	8 18	17 18	18 18	19 13	20 20	22 11	23 19	25 19	27 19	29 16	31 16	32 16	14	91	3	79	30	30	15	11	11	11	11	Aug.
				280	3 12	3 1	7 7	11 17	15 17	19 13	20 20	22 11	23 19	25 19	27 19	29 16	31 16	32 16	18	108	3	108	35	35	19	0	0	0	0	Feb., June
				282	3 8	4 0	1 26	15 18	19 13	20 20	22 11	23 19	25 19	27 19	29 16	31 16	32 16	1	108	3	108	35	35	19	0	0	0	0	Aug.	

† Disqualified under Clause 25 (pen produced less than 1,020 eggs.)

13. Dead.

SECTION IV.—WHITE WYANDOTTIC (STATION 1. HOLDERS) —29 TENS.

[illegible]

ID, = Dead.

SECTION IV.—WHITE WYANDOTTE—continued.

Order of Merit	NAME AND ADDRESS OF OWNER	Date of Hatching	WEIGHT		EGGS LAID												EGGS PER PULLET			Value per Pullet	Average Weight of Eggs	(a) Total Eggs from Pen.				Eggs under Prescribed Weight	Number of times Broody	Date of Moulting. (Neck moults in italics)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
			On Ar-rival	At close of test	Nov. 10-Nov. 5	Dec. 4	Jan. 1-Jan. 1	Jan. 29	Jan. 26	Feb. 26	Mar. 26	Apr. 21	May 16	June 16	July 13	Aug. 10	Special Grade	First Grade	Second Grade			Total	First Grade	Second Grade	Total				Lb. oz.	Lb. oz.	Lb. oz.	Lb. oz.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
6	67	Mrs. A. B. Barbour, Kucabog House, Collooney, Co. Sligo.	379 380 381 382 383 384	4 11 4 14 4 14 5 1 4 13 4 15	5 8 4 12 4 14 D 5 3 6 6	13 20 18 17 18 17 23 26 23 26 23 26	20 25 23 23 23 23 23 23 23 23 23 23	16 15 16 15 16 15 17 21 21 23 21 23	15 17 16 17 16 17 17 21 21 23 21 23	19 22 23 23 23 23 23 23 23 23 23 23	23 23 23 23 23 23 23 23 23 23 23 23	23 23 23 23 23 23 23 23 23 23 23 23	23 23 23 23 23 23 23 23 23 23 23 23	23 23 23 23 23 23 23 23 23 23 23 23	23 23 23 23 23 23 23 23 23 23 23 23	68	1	298	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51

SECTION IV.—WHITE WYANDOTTE.—continued.

Order of Merit	NAME AND ADDRESS OF OWNER	Date of Hatching	No. of Pullet	WEIGHT		EGGS LAID										EGGS PER POULET				Value per Pullet	Average Weight of Eggs per Pullet	Totals				Breeders' Weight	Number of Eggs	Date of Moulting (Next Month in Italics)
				On arrival of first	At close of test	Oct. 10-Nov. 6	Nov. 7-Dec. 4	Dec. 5-Jan. 1	Jan. 2-Jan. 29	Jan. 30-Feb. 20	Feb. 21-Mar. 26	Mar. 27-Apr. 23	Apr. 24-May 31	May 32-June 18	June 19-July 16	July 17-Aug. 13	Aug. 14-Sept. 10	Special Grade	First Grade			Second Grade	Total	First Grade—Oct. 10-Jan. 9	(a) Total Eggs from Pen.				(b) Total weight.	(c) Av. weight per dozen.	(d) Total value from pen.
11	Miss M. Byrne, Montevideo, Roscrea, Co. Tipperary.	25/2/33	295	4 9	6 6	15	17	19	19	16	15	17	10	10	11	9	5	131	36	—	—	167	56	1,067	—	—	June	
		"	296	4 8	4 14	4	20	18	14	17	19	20	16	11	15	13	13	173	96	—	—	186	56	1,132	4	4	July	
		"	297	4 12	4 14	4	20	18	14	17	19	20	16	11	15	13	13	173	96	1	1	166	46	1,183	12	12	July	
		"	298	4 9	5 12	6	23	18	13	16	19	21	12	11	18	7	12	69	96	—	—	211	34	1,166	8	8	July	
		3/3/33	300	4 11	5 8	—	9	12	18	21	20	23	23	20	11	10	10	178	27	—	—	178	33	1,178	9	9	Oct., July	
12	Mrs. M. Kelly, Cedar Lodge, Rosslare Strand, Co. Wexford.	1933	337	5 12	5 10	11	25	13	20	22	20	23	24	21	13	17	14	202	20	1	—	223	54	1,067	—	—	June, July	
		February	338	4 15	4 8	20	22	21	18	22	23	21	10	4	—	—	—	180	47	2	—	182	69	1,132	8	8	June	
		"	339	5 2	D	25	23	18	22	23	21	15	1	D	—	—	—	162	47	2	—	151	70	1,183	8	8	—	
		"	340	5 3	D	22	24	16	22	23	21	9	—	—	—	—	—	168	35	1	—	175	66	1,205	4	4	Dec., June	
		"	342	4 11	D	20	8	1	20	9	4	D	—	—	—	—	—	24	24	1	—	70	51	1,111	8	8	July	
13	Mrs. R. B. Eadie, The Poplars, Beaufort, Co. Kerry.	11/2/33	313	4 14	4 4	14	1	16	11	20	23	22	21	13	19	12	16	4	125	79	1	—	187	13	1,105	—	—	June, July
		"	314	5 0	D	17	13	11	18	20	23	23	24	23	22	1	D	120	45	3	—	200	47	1,161	4	4	June	
		20/2/33	315	4 12	6 2	18	17	3	19	22	22	21	16	17	13	7	13	118	48	3	—	166	34	1,177	—	—	Dec., June	
		"	316	5 0	D	15	15	15	17	21	23	23	24	23	22	18	13	114	75	3	—	195	27	1,264	—	—	July	
		3/2/33	317	4 14	5 4	6	—	18	17	17	21	23	19	20	18	18	175	18	2	—	192	53	1,205	11	11	June, July		
		"	318	5 6	5 6	14	15	21	20	20	19	21	18	11	10	12	11	114	75	3	—	192	53	1,205	11	11	July	
14	Miss K. Newman, Drinadaly, Trim, Co. Meath.	1933	355	6 2	6 9	3	16	16	19	15	22	24	23	15	3	15	12	166	17	—	—	183	40	1,034	—	—	Aug.	
		January	356	5 6	6 8	42	22	24	21	22	24	20	24	15	16	20	10	72	151	7	—	230	60	1,103	—	—	July, Aug.	
		"	357	5 14	6 4	22	9	—	16	19	20	26	26	25	23	20	197	9	1	—	207	30	1,181	1	1	Dec., Aug.		
		"	358	5 3	5 4	21	20	19	18	15	23	24	21	17	12	12	—	114	92	—	—	185	40	1,103	—	—	June	
		February	359	4 4	5 14	16	5	11	18	19	23	24	21	17	12	12	—	182	27	2	—	153	51	1,205	11	11	June	
		"	360	4 14	D	22	21	10	—	—	—	—	—	—	—	—	—	24	27	2	—	153	51	1,205	11	11	June	
15	Miss N. O'Sullivan, Kiltanna, Knockaderry, Newcastle West, Co. Limerick.	6/2/33	307	4 12	5 2	7	9	26	23	23	24	25	25	21	20	20	20	93	154	1	—	248	48	1,079	—	—	June	
		"	308	5 0	D	20	19	20	21	12	D	—	—	—	—	—	—	10	76	6	—	192	50	1,132	—	—	June	
		10/3/33	309	4 11	5 0	13	13	19	19	20	22	18	18	13	17	13	13	206	43	1	—	199	38	1,103	—	—	June	
		"	310	4 13	4 12	9	23	19	14	21	24	23	19	10	23	19	10	26	35	26	—	163	3	1,103	—	—	Nov., June	
		6/2/33	312	4 12	5 0	14	8	15	18	23	21	22	22	16	12	15	4	61	83	5	—	149	8	1,205	6	6	July	

† Disqualified under Clause 26 (pen produced less than 1,020 eggs.)

D. = Dead

SECTION IV.—WHITE WYANDOTTIE—continued.

Order of Merit	NAME AND ADDRESS OF OWNER	Date of Hatching	WEIGHT		EGGS LAID										EGGS PER PULLET		Average Weight of Eggs per Pullet	(a) Total Eggs from Pen.				Number of times Broody	Date of Moulting (Week months in italics)			
			On Ar-rival of Test	At close of Test														Value per Pullet	Eggs under Prescribed Weight	Total weight per dozen	Total value from Pen.					
			lb. oz.	lb. oz.	Oct. 10-Nov. 6	Nov. 7-Dec. 4	Dec. 5-Jan. 1	Jan. 2-Jan. 23	Jan. 30-Feb. 20	Feb. 27-Mar. 19	Mar. 27-Apr. 13	Apr. 24-May 21	May 22-June 18	June 19-July 6	July 17-Aug. 13	Aug. 14-Sept. 10										
15	Miss M. O'Keefe, Ballyboden, Knocktopher, Co. Kilkenny.	25/2/33	367 5 0	5 8	—	4 22 20	22 20	22 20	20 20	20 20	22 22	23 21	23 16	21 16	21 12	11 36	First Grade— Oct. 10-Jan. 9	31 18 53	2 2	(a) 1425 (b) 127 8 15 (c) 25.7 (d) 75 6 2½	—	1	Oct., Jan., July, Aug., Aug., Jan., July			
†	Mrs. M. J. Williams, Mitton, Kinnacow, Co. Kilkenny.	1/3/33	391 4 9	5 2	19 21	8 23	23 21	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	9 101	2 2	(a) 968 (b) 128 11 12 (c) 25.5 (d) 75 3 4½	—	4	June, June, June, July, July, June				
†	Mrs. K. O'Driscoll, Lisloose, Tralee, Co. Kerry.	March, February	310 4 8	D	4 20	16 17	19 14	21 21	20 21	21 21	21 21	21 21	21 21	21 21	21 21	21 21	1 178	2 2	(a) 937 (b) 120 9 8 (c) 26.5 (d) 75 2 2½	—	—	June, June, July, July, July, June				
†	Mr. P. Hannon, Deerpark, Cloghan, Rhode, Brederry, Offaly.	1933, January	343 4 10	D	1 13	16 18	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	3 80	2 2	(a) 886 (b) 121 13 5 (c) 26.4 (d) 75 2 8½	3	—	Oct., June, June, Mar., June, Oct., July, Feb., July				
†	Mrs. R. Elkin, Lettrim House, Lecanoy, Noville, Co. Donegal.	27/1/33, 25/2/33, 1/4/33, 29/5/33, 5/1/33	349 5 2	D	6 7	16 16	4 15	12 12	12 12	12 12	12 12	12 12	12 12	12 12	12 12	12 12	4 67	1 1	(a) 910 (b) 121 11 12 (c) 25.7 (d) 75 0 2	—	—	—, Aug., Aug., Jan., Aug.				

† Disqualified under Clause 25 (pen produced less than 1,020 eggs). D. = Dead.

SECTION V.—ANY SITTING BREED OTHER THAN WHITE WYANDOTTE (STATION HOLDERS)—29 PENS.

Order of Merit	NAME AND ADDRESS OF OWNER	Date of Hatching	WEIGHT		EGGS LAID										EGGS PER PULLET			Average Weight of Eggs	(a) Total Eggs from Pen (b) Total weight (c) Av. weight per dozen. (d) Total value from pen.				Eggs under Prescribed Weight	Number of times Broody	Date of Moulting. (Neck moult in italics)		
			No. of Pullet	On At- tival lb. oz.	Close of Test lb. oz.	Oct. 10-Nov. 6	Nov. 7-Dec. 4	Dec. 5-Jan. 1	Jan. 2-Jan. 29	Jan. 30-Feb. 26	Feb. 27-Mar. 26	Mar. 27-Apr. 23	Apr. 24-May 21	May 22-June 18	June 19-July 16	July 17-Aug. 13	Aug. 14-Sept. 10		Special Grade	First Grade	Second Grade	Total				First Grade— Oct. 10-Jan. 9	Value per Pullet
1	Rhode Island Red. Miss C. Meallif, Ballinamona House, Tullamore, Offaly.	26/2/33 28/1/33 28/8/33 26/2/33	409 501 500 503 504	5 11 5 14 4 10 5 4 4 0	5 8 5 9 5 0 3 8 5 0	5 9 22 22 19	28 11 22 22 24	25 20 22 22 16	21 23 22 22 16	22 25 22 22 16	22 23 23 20 21	16 24 23 20 21	18 24 11 16 17	21 11 17 14 15	30 20 17 6 10	32 236 241 389 204	32 12 5 9 5	236 241 389 204 390	60 25 25 73 35	1 1 1 1 1	(a) 1,407 (b) 14.07 dr. (c) 193 8 1 (d) 26.4 (e) 27 9 8	3 3 3 3 3	June Oct., July July July Aug.				
2	Rhode Island Red. Miss M. O'Donovan, Dromore, Villierstown, Cappoquin, Co. Waterford.	1933 March " " " "	427 428 429 430 431 432	4 12 4 12 5 5 5 3 4 11 5 2	4 8 4 6 5 14 5 3 5 15 5 10	13 24 23 21 12 14	5 19 25 25 24 23	17 20 20 25 24 22	22 19 20 20 21 21	23 20 23 23 22 24	23 23 23 20 23 24	24 24 23 20 23 24	13 18 16 13 12 18	20 10 15 17 19 21	8 10 15 16 10 21	30 230 250 232 232 145	1 1 2 2 20 25	230 230 232 232 145 252	40 20 20 23 76 57	— — — — — —	(a) 1,301 (b) 176 0 9 (c) 210 0 (d) 27.0 (e) 27.0 3 1	3 2 4 4 2 2	June June June July July Aug.				
3	Rhode Island Red. Mrs. H. Bruce, Hill Brook, Birr., Offaly.	February " " " "	475 476 477 478 479 480	4 12 4 10 4 9 4 8 5 1 5 11	4 12 4 10 4 9 4 8 5 1 5 11	17 18 18 18 18 18	22 16 16 16 16 16	22 21 21 21 21 21	19 20 20 20 20 20	23 23 23 23 23 23	26 26 26 26 26 26	26 26 26 26 26 26	22 22 22 22 22 22	23 23 23 23 23 23	19 20 20 20 20 20	120 180 180 180 180 180	1 4 4 4 2 —	236 180 180 180 180 156	51 49 43 39 38 0	— — — — — —	(a) 1,287 (b) 181 3 4 (c) 27.0 (d) 27.0 13 9 1	— — — — — —	Aug. July Aug. June Aug. Oct., Aug.				
4	Rhode Island Red. Mrs. J. McCarthy, Caherly Castle, Grange, Kilnaloeck, Co. Limerick.	5/3/33 " " " "	403 404 405 406 407 408	5 8 4 8 4 8 4 8 4 8 4 8	5 8 4 8 4 8 4 8 4 8 4 8	22 22 22 22 22 22	23 23 23 23 23 23	23 23 23 23 23 23	17 17 17 17 17 17	14 14 14 14 14 14	17 17 17 17 17 17	13 13 13 13 13 13	8 8 8 8 8 8	— — — — — —	— — — — — —	72 208 140 140 140 140	4 4 4 4 4 4	123 256 224 224 224 210	59 53 54 54 54 54	— — — — — —	(a) 1,250 (b) 160 2 10 (c) 26.0 (d) 26.0 13 4 1	— — — — — —	Aug. July July July July June				
5	Rhode Island Red. Mrs. A. McHugh, Claggan, Carrigart, Co. Donegal.	15/3/33 9/2/33 " " "	403 404 405 406 407 408	4 12 4 8 4 8 4 8 4 8 4 8	4 12 4 8 4 8 4 8 4 8 4 8	1 22 19 16 25 16	22 19 16 16 23 16	22 22 22 22 22 22	15 13 13 13 13 13	15 15 15 15 15 15	21 21 21 21 21 21	25 25 25 25 25 25	22 22 22 22 22 22	22 22 22 22 22 22	18 18 18 18 18 18	22 22 22 22 22 22	15 15 15 15 15 15	1 6 2 2 2 2	224 224 224 224 224 224	54 50 50 50 50 50	— — — — — —	(a) 1,234 (b) 105 11 13 (c) 25.8 (d) 25.8 12 4 1	— — — — — —	June June June June June June			

D. = Dead.

SECTION V.—ANY SITTING BREED OTHER THAN WHITE WYANDOTTE (STATION HOLDERS)—continued

Order of Merit	NAME AND ADDRESS OF OWNER	Date of Hatching	No. of Pullet	WEIGHT		EGGS LAID												EGGS PER PULLET		Average Weight of Eggs per Pullet	(a) Total Eggs from Pen. (b) Total weight. (c) Av. Weight per dozen. (d) Total value from Pen.				Bugs under Prescribed	Number of times Broody	Date of Moulting (Neck moults in italics)			
				On Ar-rival	At close of test	Oct. 10-Nov. 6	Nov. 7-Dec. 4	Dec. 5-Jan. 1	Jan. 2-Jan. 29	Feb. 30-Mar. 26	Mar. 27-Apr. 23	Apr. 24-May 21	May 22-June 18	June 19-July 16	July 17-Aug. 13	Aug. 14-Sept. 10	Special Grade	First Grade	Second Grade		Total	First Grade—Oct. 10-Jan. 9								
6	74	Rhode Island Red. Mrs. E. M. Hodgkins, Dangan, Roscrea Co. Tipperary.	15/2/83 " " " " " "	421 422 423 424 425 426	5 6 4 10 4 6 5 2 4 12 4 15 4 11 4 4 5 4	18 18 20 20 20 20 20 20 20	20 20 20 20 20 20 20 20 20	20 20 20 20 20 20 20 20 20	20 20 20 20 20 20 20 20 20	20 20 20 20 20 20 20 20 20	20 20 20 20 20 20 20 20 20	20 20 20 20 20 20 20 20 20	20 20 20 20 20 20 20 20 20	20 20 20 20 20 20 20 20 20	20 20 20 20 20 20 20 20 20	20 20 20 20 20 20 20 20 20	85 85 85 85 85 85 85 85 85	217 217 217 217 217 217 217 217 217	145 145 145 145 145 145 145 145 145	63 63 63 63 63 63 63 63 63	207 207 207 207 207 207 207 207 207	35 35 35 35 35 35 35 35 35	221 221 221 221 221 221 221 221 221	62 62 62 62 62 62 62 62 62	21 21 21 21 21 21 21 21 21	24 24 24 24 24 24 24 24 24	3 3 3 3 3 3 3 3 3	(a) 1,254 (b) 104 5 7 (c) 23.2 (d) 25.11 31	1 1 1 1 1 1 1 1 1	July Aug. Nov., July June Aug. Aug.
7	90	Buff Rock. Sister-in-Charge, The Technical School, Stradally, Laoighis.	1933 January February January "	523 524 525 526 527 528	5 2 5 2 5 2 5 2 5 10 5 11	18 18 18 18 18 18	18 18 18 18 18 18	18 18 18 18 18 18	18 18 18 18 18 18	18 18 18 18 18 18	18 18 18 18 18 18	18 18 18 18 18 18	18 18 18 18 18 18	18 18 18 18 18 18	18 18 18 18 18 18	18 18 18 18 18 18	172 172 172 172 172 172	168 168 168 168 168 168	12 12 12 12 12 12	243 243 243 243 243 243	64 64 64 64 64 64	25 25 25 25 25 25	103 103 103 103 103 103	67 67 67 67 67 67	27 27 27 27 27 27	51 51 51 51 51 51	2 2 2 2 2 2	(a) 1,265 (b) 160 10 11 (c) 23.7 (d) 25.10 74	3 3 2 2 2 2	May June, Aug. Aug. Oct., July Nov., Aug. June, Aug.
8	91	Buff Rock. Mrs. J. A. Donegan, Blaketown, Ardee, Co. Louth.	3/2/83 " " " " " " " " " "	529 530 531 532 533 534	5 13 5 13 5 13 5 13 5 13 5 13	16 16 16 16 16 16	16 16 16 16 16 16	16 16 16 16 16 16	16 16 16 16 16 16	16 16 16 16 16 16	16 16 16 16 16 16	16 16 16 16 16 16	16 16 16 16 16 16	16 16 16 16 16 16	16 16 16 16 16 16	16 16 16 16 16 16	187 187 187 187 187 187	137 137 137 137 137 137	51 51 51 51 51 51	232 232 232 232 232 232	48 48 48 48 48 48	32 32 32 32 32 32	23 23 23 23 23 23	17 17 17 17 17 17	22 22 22 22 22 22	2 2 2 2 2 2	(a) 1,234 (b) 104 11 12 (c) 23.7 (d) 25.8 7	1 1 1 1 1 1	July, Aug. July, Aug. July July July, Aug. May	
9	99	Barred Rock. Mrs. M. A. Kelly, Carranstown, Ballycor, Co. Meath.	22/2/83 " " " " " " " " " "	595 596 597 598 599 600	5 6 5 9 5 2 5 2 5 6 5 3	12 12 12 12 12 12	12 12 12 12 12 12	12 12 12 12 12 12	12 12 12 12 12 12	12 12 12 12 12 12	12 12 12 12 12 12	12 12 12 12 12 12	12 12 12 12 12 12	12 12 12 12 12 12	12 12 12 12 12 12	12 12 12 12 12 12	164 164 164 164 164 164	150 150 150 150 150 150	95 95 95 95 95 95	243 243 243 243 243 243	11 11 11 11 11 11	24 24 24 24 24 24	15 15 15 15 15 15	14 14 14 14 14 14	1 1 1 1 1 1	(a) 1,271 (b) 101 11 6 (c) 24.4 (d) 24.1 44	4 4 4 4 4 4	June Aug. Feb., Aug. Aug. Aug.		
9	97	Barred Rock. Miss B. Power, Slieverue, Butterstown, Co. Waterford.	14/2/83 " " " " " " " " " "	583 584 585 586 587 588	5 2 5 10 5 10 5 10 5 10 5 15	3 3 3 3 3 3	3 3 3 3 3 3	3 3 3 3 3 3	3 3 3 3 3 3	3 3 3 3 3 3	3 3 3 3 3 3	3 3 3 3 3 3	3 3 3 3 3 3	3 3 3 3 3 3	3 3 3 3 3 3	3 3 3 3 3 3	182 182 182 182 182 182	182 182 182 182 182 182	8 8 8 8 8 8	200 200 200 200 200 200	28 28 28 28 28 28	10 10 10 10 10 10	102 102 102 102 102 102	2 2 2 2 2 2	(a) 1,144 (b) 153 12 10 (c) 25.8 (d) 25.1 14	2 2 2 2 2 2	Oct., June, Aug. June, Aug. June, Aug. June, Aug. June, Aug. July			

*Disqualified under Clause 25 (more than 20 per cent. second grade eggs).

D=Dead

SECTION V.—ANY SITTING BREED OTHER THAN WHITE WYANDOTTE (STATION HOLDERS)—continued.

Order or Merit	NAME AND ADDRESS OF OWNER	Date of Hatching	WEIGHT		No. of Pullets	EGGS LAID										EGGS PER PULLET		Average Weight of Eggs per Pullet	(a) Total Eggs from Pen.				Bugs under Prescribed Weight	Number of times Broody	Date of Moulting (Neck moulting in italics)
			On Ar- rival of Test	At Close of Test		Oct. 10-Nov. 6	Nov. 7-Dec. 4	Dec. 5-Jan. 1	Jan. 2-Jan. 29	Jan. 30-Feb. 26	Feb. 27-Mar. 26	Mar. 27-Apr. 23	Apr. 24-May 21	May 22-June 18	June 19-July 16	July 17-Aug. 13	Aug. 14-Sept. 10		Special Grade	First Grade	Second Grade	Total				First Grade— Oct. 10-Jan. 9	Value per Pullet	(b) Total weight.	(c) Av. weight per dozen.	(d) Total value from pen.
10	Rhode Island Rd. Mrs. E. Loughrey, Dr. D. Grushen, Co. Clare.	27/3/33 " " " "	415 416 417 418 419 420	5 0 4 15 5 9 5 4 5 4 5 11	4 12 4 9 5 6 5 6 5 6 5 8	10 11 11 10 10 10 11 10 12 11 13 23	20 11 21 14 22 19 23 21 24 21 25 23	26 11 27 14 28 19 29 21 30 21 31 23	1 21 2 21 3 21 4 21 5 21 6 21	17 20 18 21 19 21 20 21 21 21 22 21	15 13 16 14 17 14 18 14 19 14 20 14	21 21 22 21 23 21 24 21 25 21 26 21	27 21 28 21 29 21 30 21 31 21 1 21	2 21 3 21 4 21 5 21 6 21 7 21	7 12 8 13 9 14 10 15 11 16 12 17	12 14 13 15 14 16 15 17 16 18 17 19	8 14 9 15 10 16 11 17 12 18 13 19	149 150 151 152 153 154	45 46 47 48 49 50	202 203 204 205 206 207	21 21 22 21 23 21 24 21 25 21 26 21	s. d. oz. dr.	1 224 1 161 1 161 1 253 1 253 1 253	June Aug. June June June Dec., June	
11	Rhode Island Rd. Mrs. M. Smyth, Rildoon, Dumboone, Co. Meath.	15/2/33 " " " " 10/3/33 15/2/33	517 518 519 520 521 522	4 9 4 10 5 0 5 1 4 8 5 6	4 9 5 9 5 4 5 1 4 4 5 6	14 16 15 17 16 18 17 19 18 20 19 21	20 21 21 22 22 23 23 24 24 25 25 26	26 27 27 28 28 29 29 30 30 31 1 1	1 21 2 21 3 21 4 21 5 21 6 21	15 13 16 14 17 14 18 14 19 14 20 14	21 21 22 21 23 21 24 21 25 21 26 21	27 21 28 21 29 21 30 21 31 21 1 21	2 21 3 21 4 21 5 21 6 21 7 21	7 12 8 13 9 14 10 15 11 16 12 17	12 14 13 15 14 16 15 17 16 18 17 19	8 14 9 15 10 16 11 17 12 18 13 19	149 150 151 152 153 154	45 46 47 48 49 50	202 203 204 205 206 207	21 21 22 21 23 21 24 21 25 21 26 21	s. d. oz. dr.	1 139 1 154 1 154 1 260 1 260 1 260	June Aug. Aug. Feb., July Feb., July Aug.		
12	Buff Rock. Mrs. K. McCabe, Derry, Aughamullen, Castledowney, Co. Monaghan.	1933 February " " " " "	553 554 555 556 557 558	5 5 5 0 5 2 5 3 5 3 5 3	5 0 5 4 5 8 5 3 5 3 5 3	17 20 18 21 19 22 20 23 21 24 22 25	23 24 24 25 25 26 26 27 27 28 28 29	29 30 30 31 1 1 2 2 3 3 4 4	1 21 2 21 3 21 4 21 5 21 6 21	15 13 16 14 17 14 18 14 19 14 20 14	21 21 22 21 23 21 24 21 25 21 26 21	27 21 28 21 29 21 30 21 31 21 1 21	2 21 3 21 4 21 5 21 6 21 7 21	7 12 8 13 9 14 10 15 11 16 12 17	12 14 13 15 14 16 15 17 16 18 17 19	8 14 9 15 10 16 11 17 12 18 13 19	164 165 166 167 168 169	34 35 36 37 38 39	202 203 204 205 206 207	21 21 22 21 23 21 24 21 25 21 26 21	s. d. oz. dr.	1 101 1 148 1 148 1 245 1 245 1 245	Aug. Aug. June June June July		
* 04	Buff Rock. Mrs. B. McKenna, Gilttown, Navan, Co. Meath.	8/1/33 28/1/33 " 9/3/33 "	559 560 561 562 563 564	5 6 5 2 5 0 5 4 5 2 5 0	5 12 5 0 4 12 4 6 4 6 4 6	10 18 11 19 12 20 13 21 14 22 15 23	19 20 20 21 21 22 22 23 23 24 24 25	25 26 26 27 27 28 28 29 29 30 30 31	1 21 2 21 3 21 4 21 5 21 6 21	15 13 16 14 17 14 18 14 19 14 20 14	21 21 22 21 23 21 24 21 25 21 26 21	27 21 28 21 29 21 30 21 31 21 1 21	2 21 3 21 4 21 5 21 6 21 7 21	7 12 8 13 9 14 10 15 11 16 12 17	12 14 13 15 14 16 15 17 16 18 17 19	8 14 9 15 10 16 11 17 12 18 13 19	157 158 159 160 161 162	31 32 33 34 35 36	157 158 159 160 161 162	22 22 23 23 24 24 25 25 26 26 27 27	s. d. oz. dr.	1 171 1 151 1 151 1 249 1 249 1 249	Dec., Aug. Aug. June July Aug. Aug.		
13	Buff Rock. Mrs. M. T. Ffrench, Pouffalle, New Ross, Co. Wexford.	Feb. and March " " " "	535 536 537 538 539 540	5 0 5 0 5 0 5 8 5 8 5 2	5 0 5 0 5 0 5 12 5 12 5 12	12 13 13 14 14 15 15 16 16 17 17 18	20 21 21 22 22 23 23 24 24 25 25 26	26 27 27 28 28 29 29 30 30 31 1 1	1 21 2 21 3 21 4 21 5 21 6 21	15 13 16 14 17 14 18 14 19 14 20 14	21 21 22 21 23 21 24 21 25 21 26 21	27 21 28 21 29 21 30 21 31 21 1 21	2 21 3 21 4 21 5 21 6 21 7 21	7 12 8 13 9 14 10 15 11 16 12 17	12 14 13 15 14 16 15 17 16 18 17 19	8 14 9 15 10 16 11 17 12 18 13 19	172 173 174 175 176 177	52 53 54 55 56 57	227 228 229 230 231 232	35 35 36 36 37 37 38 38 39 39 40 40	s. d. oz. dr.	1 160 1 152 1 152 1 253 1 253 1 253	Aug. Aug. June, Aug. March, Aug. June June		

* Disqualified under Clause 25 (more than 20 per cent. second grade eggs).

D. = Dead.

SECTION V.—ANY SITTING BREED OTHER THAN WHITE WYANDOTTE (STATION HOLDERS)—continued.

Order of Merit	NAME AND ADDRESS OF OWNER	Date of Hatching	No. of Pullets	WEIGHT		EGGS LAID										EGGS PER PULLET			Average Weight of Eggs per Pullet	(a) Total Eggs from Pen.			Number of times Broody	Date of Moulting (Neck moults in Italics)		
				On arrival	At close of test	Oct. 10-Nov. 9	Nov. 7-Dec. 4	Dec. 5-Jan. 1	Jan. 2-Jan. 29	Jan. 30-Feb. 26	Feb. 27-Mar. 26	Mar. 27-Apr. 13	Apr. 14-May 21	May 22-June 18	June 19-July 16	July 17-Aug. 13	Aug. 14-Sept. 10	Special Grade		First Grade	Second Grade	Total			Oct. 10-Jan. 9	Value per Pullet	(b) Total weight.	(c) Av. weight per dozen.	(d) Total value from Pen.
* 76	Rhode Island Red. Mrs. H. Langrell, Killinure, Tullow Co. Wicklow.	10/3 February " " March " "	433 434 435 436 437	6 1 5 4 4 11 5 5 5 0	5 12 4 11 4 7 5 8 5 12	19 23 18 20 17	18 22 10 22 20	15 21 14 22 15	18 19 16 22 23	19 20 19 23 23	12 19 16 20 22	19 20 20 23 23	19 20 20 23 23	17 20 20 23 23	19 20 20 23 23	16 15 20 21 22	6 119 126 138 142	79 52 82 186 18	— — — 233 —	198 178 186 205 138	60 58 36 8 —	22 17 19 21 11	3 4 6 14 5	(a) 1,211 lb. oz. dr. (b) 101 2 8 oz. (c) 25.5 lb. oz. dr. (d) 5 12 4	— — 7 — —	— — — — —
14 100	Barred Rock. Mrs. E. A. Henderson, Ardrum, Innisceara, Co. Cork.	10/2/33 " " " " 20/3/33 16/2/33 10/3/33	601 602 603 604 605 606	5 10 5 11 6 0 6 3 6 3 5 9	5 8 6 9 6 9 6 1 6 1 5 7	13 17 14 14 17 16	17 14 14 18 10 24	18 18 10 13 11 11	16 18 20 22 25 25	17 20 22 23 24 24	20 21 21 22 25 24	23 25 26 28 28 28	19 21 21 23 23 24	23 25 26 28 28 28	20 21 21 23 23 24	16 15 16 17 13 14	118 101 131 143 142 142	86 10 92 35 28 185	— 2 2 39 5	204 203 213 183 205	53 62 23 15 49	21 20 11 15 21	0 2 2 2 2	(a) 1,107 lb. oz. dr. (b) 153 8 15 oz. (c) 20.0 lb. oz. dr. (d) 5 12 4	— — — — 4	— — — — —
† 88	Rhode Island Red. Mrs. O. McKenna, Doogheys, Glasslough, Co. Monaghan.	24/2/33 " " " " " " " "	505 506 507 508 509 510 U.T.	4 8 4 12 4 12 5 0 4 13 4 10	4 12 4 12 4 12 5 0 5 3 5 0	21 12 17 8 16 10	23 19 20 17 8 23	21 20 13 13 2 21	21 20 23 23 16 21	21 23 24 24 16 24	21 23 25 26 14 20	23 25 26 28 28 28	23 25 26 28 28 28	23 25 26 28 28 28	22 23 24 24 16 21	10 13 13 15 17 18	78 116 130 144 107 135	2 5 6 8 23 1	251 136 184 184 171 1	70 69 30 50 —	27 24 18 19 18 0	5 6 3 2 2 1	(a) 1,017 lb. oz. dr. (b) 136 0 11 oz. (c) 26.7 lb. oz. dr. (d) 5 11 11 1/4	— 2 — 2 3 —	— — — — —	
15 85	Rhode Island Red. Mrs. A. R. Ferguson, Cloghduley, Co. Sligo.	11/3/33 4/3/33 " " " " " "	487 488 489 490 491 492	5 0 4 14 5 3 4 11 4 11	5 7 5 6 5 6 5 11 5 1	15 21 2 14 19	16 18 17 14 21	16 19 15 13 14	22 23 23 23 23	23 24 25 26 26	23 24 25 26 26	23 24 25 26 26	23 24 25 26 26	23 24 25 26 26	23 24 25 26 26	20 19 18 19 20	54 116 143 90 161 103	6 — 1 32 15	200 231 198 212 197	45 53 28 38 18	21 24 18 20 18	11 6 6 2 2	(a) 1,101 lb. oz. dr. (b) 156 10 10 oz. (c) 25.9 lb. oz. dr. (d) 5 11 9 1/4	— — — — 1	— — — — —	
16 77	Rhode Island Red. Mrs. K. Sheehy, Bridge House, Ballygarry, Co. Limerick.	March " " " " " " " "	439 440 441 442 443 444	5 11 5 6 5 10 4 11 5 0 5 0	6 0 4 10 5 15 5 8 6 2 6 2	3 18 18 4 21 21	20 17 19 12 19 21	22 18 24 27 17	22 23 24 27 28	22 23 24 27 28	22 23 24 27 28	22 23 24 27 28	22 23 24 27 28	22 23 24 27 28	22 23 24 27 28	16 18 18 14 10	121 191 143 156 160	1 18 55 99 109	150 206 170 218 153 156	8 60 23 48 44	13 20 16 18 16 16	2 2 6 5 4 9	(a) 1,059 lb. oz. dr. (b) 143 0 8 oz. (c) 25.9 lb. oz. dr. (d) 5 7 9 1/4	— — 5 2 — —	— — — — —	

‡Disqualified under Clause 25 (pen produced less than 1,020 eggs).

*Disqualified under Clause 25 (more than 20 per cent. second grade eggs).

D. = Dead.

U.T. = Untrapped.

Order of Merit	Number of Pen	NAME AND ADDRESS OF OWNER	Date of Hatching	No. of Pullet	WEIGHT		EGGS LAID												EGGS PER PULLER				Average Weight of Eggs per Pullet	(a) Total Eggs from Pen.				Number of times Broody	Date of Moulting (Neck moult in italics)			
					On Ar-rival of test	At close of test	Oct. 10-Nov. 6	Nov. 7-Dec. 4	Dec. 5-Jan. 1	Jan. 2-Jan. 28	Jan. 30-Feb. 26	Feb. 27-Mar. 26	Mar. 27-Apr. 23	Apr. 24-May 21	May 22-June 18	June 19-July 16	July 17-Aug. 13	Aug. 14-Sept. 10	Special Grade	First Grade	Second Grade	Total		First Grade	Oct. 10-Jan. 9	Value per Pullet	Average Weight of Eggs per Pullet			(b) Total weight.	(c) Av. weight per dozen.	(d) Total value from pen.
					lb. oz.	lb. oz.																										
17	78	Rhode Island Red. Mrs. M. Cruite, Tulla, Three Castles, Co. Kilkenny.	March " " " "	445 446 447 448 449 450 U.T.	4 10 4 14 5 0 5 13 4 14 5 10	5 0 6 0 6 0 6 9 5 10 5 10	20 20 20 24 20 19 20 18 20 18 20 11	20 4 22 21 22 18 22 8 22 12 22 17	22 4 22 21 22 18 22 21 22 18 22 17	22 3 22 21 22 18 22 21 22 18 22 17	22 18 22 20 22 19 22 18 22 18 22 17	22 13 22 20 22 19 22 18 22 18 22 17	22 25 22 23 22 23 22 21 22 21 22 21	22 23 22 23 22 23 22 21 22 21 22 21	22 18 22 16 22 15 22 15 22 15 22 15	22 15 22 15 22 15 22 15 22 15 22 15	22 15 22 15 22 15 22 15 22 15 22 15	101 103 103 103 103 103	82 83 83 83 83 83	11 11 11 11 11 11	200 200 200 200 200 200	100 100 100 100 100 100	100 100 100 100 100 100	3 4 3 3 3 3	July Oct., Feb., June Oct., Feb., July Jan., Aug., Oct., Feb., July.							
†	95	Light Sussex. Miss E. Walsh, Ballymore Lodge, Cappagh, Co. Waterford.	2/3/83 " " " "	565 566 567 568 569 570	5 12 5 18 6 10 6 10 5 9 5 8	5 14 6 10 7 10 6 2 5 0 5 12	18 16 18 16 20 26 20 22 20 22 20 22	16 15 16 15 20 26 20 22 20 22 20 22	15 15 15 15 21 14 21 14 21 14 21 14	15 15 15 15 21 14 21 14 21 14 21 14	15 15 15 15 21 14 21 14 21 14 21 14	15 15 15 15 21 14 21 14 21 14 21 14	15 15 15 15 21 14 21 14 21 14 21 14	15 15 15 15 21 14 21 14 21 14 21 14	15 15 15 15 21 14 21 14 21 14 21 14	15 15 15 15 21 14 21 14 21 14 21 14	101 101 101 101 101 101	82 82 82 82 82 82	11 11 11 11 11 11	106 106 106 106 106 106	106 106 106 106 106 106	106 106 106 106 106 106	3 3 3 3 3 3	July June June June June June								
†	82	Rhode Island Red. Mr. R. M. Burke, Toghermore P. F., Thunty, Co. Galway.	9/3/83 22/3/83 9/3/83 22/2/83	469 470 471 472	4 14 4 14 4 8 4 12	4 14 4 14 4 14 4 12	18 16 18 16 18 16 18 16	18 16 18 16 18 16 18 16	18 16 18 16 18 16 18 16	18 16 18 16 18 16 18 16	18 16 18 16 18 16 18 16	18 16 18 16 18 16 18 16	18 16 18 16 18 16 18 16	18 16 18 16 18 16 18 16	18 16 18 16 18 16 18 16	18 16 18 16 18 16 18 16	18 16 18 16 18 16 18 16	101 101 101 101	82 82 82 82	11 11 11 11	155 155 155 155	155 155 155 155	155 155 155 155	3 3 3 3	Nov., Aug. Mar., June Aug., Nov., Feb., July Feb., July Aug.							
†	70	Rhode Island Red. Miss J. Rowe, Moylaw, Crossmoira, Co. Mayo.	1/2/83 " " " "	461 462 463 464 465 466	5 5 4 9 4 13 4 11 4 8 4 9	5 14 5 0 5 18 5 0 5 0 4 14	12 2 15 16 16 16 16 16 16 16 16 16	2 2 15 16 16 16 16 16 16 16 16 16	2 2 15 16 16 16 16 16 16 16 16 16	2 2 15 16 16 16 16 16 16 16 16 16	2 2 15 16 16 16 16 16 16 16 16 16	2 2 15 16 16 16 16 16 16 16 16 16	2 2 15 16 16 16 16 16 16 16 16 16	2 2 15 16 16 16 16 16 16 16 16 16	2 2 15 16 16 16 16 16 16 16 16 16	2 2 15 16 16 16 16 16 16 16 16 16	101 101 101 101	82 82 82 82	11 11 11 11	125 125 125 125	125 125 125 125	125 125 125 125	4 10 10 3	June July June June								
†	84	Rhode Island Red. Mrs. W. P. Delaney, Newtown House, Crettyard, Laoighis.	27/2/83 " 27/3/83 27/3/83 27/3/83	481 482 483 484 485 486	4 12 4 11 4 11 4 12 4 11 4 11	5 4 5 5 5 5 5 5 5 5 5 5	14 2 14 2 14 2 14 2 14 2 14 2	21 21 21 21 21 21 21 21 21 21 21 21	21 21 21 21 21 21 21 21 21 21 21 21	21 21 21 21 21 21 21 21 21 21 21 21	21 21 21 21 21 21 21 21 21 21 21 21	21 21 21 21 21 21 21 21 21 21 21 21	21 21 21 21 21 21 21 21 21 21 21 21	21 21 21 21 21 21 21 21 21 21 21 21	21 21 21 21 21 21 21 21 21 21 21 21	21 21 21 21 21 21 21 21 21 21 21 21	100 103 103 103 103 103	20 20 20 20 20 20	20 20 20 20 20 20	20 20 20 20 20 20	20 20 20 20 20 20	1 4 4 5 5 1	Oct., June Feb., June June Dec., Aug. Dec., Aug.									

† Disqualified under Clause 25 (pen produced less than 1,020 eggs).
* Disqualified under Clause 25 (more than 20 per cent. second grade eggs).
D = Disqualified under Clause 25 (more than 20 per cent. second grade eggs).

NOTES AND MEMORANDA

Regulating the Dairy Industry in Australia.

The total production of butter in Australia during the season 1933-34 exceeded that of the preceding season by some 10,000 tons, and amounted altogether to 195,000 tons.

The Australian Dairy Produce Export Board have declared that a certain percentage of the butter graded for export will be held back each week from the second week in November. The Board will seek to regulate shipments from Australia to the extent of not more than about 2,500 tons per week, but the amount exported will depend upon how conditions develop.

The voluntary scheme known as the Paterson Plan ceased to operate on 26th April, 1934, and has been replaced by the "Commonwealth Equalisation Scheme." The Paterson Plan proved a great help to the Australian dairy industry, and it is calculated that the increased receipts of dairy farmers during the eight years in which the plan was in operation amounted to about 19 million pounds sterling. The weakness of the plan lay in its being voluntary, with the result that some creameries never joined at all, whilst others were behind in their payments. It was impossible to alter the Plan into a compulsory scheme, because the Federal Government refused to legalise the payment of compensation for exported butter.

The Equalisation Scheme is based on a series of Acts passed by the parliaments in Canberra, New South Wales, Queensland and Tasmania. A limited company has been formed to work the scheme, and practically all creameries in the four states concerned have signed the company's contract. Under the new scheme, which came into force in May, 1934, the price of butter on the Australian home market was fixed at 140s. per cwt. By means of certain adjustments in relation to local prices each creamery receives the same average price for its output of butter. In May the average price obtained was 108/4, and in June 110/1 per cwt. Both prices are given in Australian money. Under laws passed by the various states butter may not be sent from one state to another without permission of the authorities, and in this way competition between the various states may be controlled. Every month the State Government fix an export quota based on the estimated production, local consumption and export, and all creameries which have not come to an agreement with the Equalisation Committee are bound to export overseas the percentage of their output corresponding to the export quota. Thus, creameries which are not shareholders in the company cannot legally sell in Australia more of their total production than the quantity which remains after they have exported the fixed monthly percentage.

Milk-Recording in Sweden, 1932-33.

The latest annual report on cow-testing in Sweden covers the period 1932-33. It is based on information supplied by milk-recording societies which are either in receipt of State grants or have agreed to come under one of the schemes organised by the provincial agricultural associations.

The returns indicate that 14.7 per cent. of all the cows in Sweden are now recorded.

The appended table shows the principal results obtained during the past six years. It should be noted that the figure in Column 2 now indicates the number of milk-recorders at work and not the number of societies, as heretofore. This change has been made in consequence of a change in organisation under which milk-recording societies may now be either organised locally within a limited area served by a single milk-recorder, or become affiliated to one of the big central organisations managed by the provincial agricultural associations. The number of societies would thus be no longer an accurate indication of the real extent of the movement, and the figure in Column 2 of the table accordingly represents the number of milk-recorders.

There has been a considerable access of new members during the year under review. Most of them are small farmers. The province of Jönköping, a typical small-farmer district, showed an increase of no fewer than 920 recorded herds. The effect of this influx of small-farmer members is that the average number of cows per recorded herd is now 16.89, whereas it was 18.94 in 1928.

NUMBERS AT END OF YEAR				AVERAGE PER COW PER ANNUM			
Year	Milk Recorders	Herds	Cows	Food- units consumed	Milk Yield, kg.	Fat %	Butter- fat kg.
1927-28	822	13,900	263,313	2,343	3,132	3.57	112
1928-29	874	15,259	276,498	2,417	3,280	3.59	118
1929-30	917	16,366	288,413	2,499	3,457	3.62	125
1930-31	938	17,097	295,902	2,476	3,534	3.63	128
1931-32	964	17,688	310,195	2,527	3,510	3.62	127
1932-33	981	17,803	300,855	2,545	3,502	3.61	126

OFFICIAL DOCUMENT.

Forty-fourth list

AN ROINN TALMHAÍOCHTA

(Department of Agriculture.)

BUTTER AND MARGARINE ACT, 1907—SECTIONS 8 AND 14 (1).

List of names approved by the Minister of Agriculture for use in connection with Margarine :—

Airlite.
 Carma.
 Daleside.
 Galleon.
 Gold Tips.
 Mixit.
 Radio.
 Weavo.

Department of Agriculture,

Dublin, C.17,

31st December, 1934.

INDEX—VOLUME XXXIII.

	PAGE
Abattoir , Loan Fund in Sweden	145
Agricultural Crisis, Danish	146
A.I.V. Silage : Tests at Rothamsted	138
Arup, Paul S., PH.D. (LOND.), F.I.C., and G. Van B. Gilmour, PH.D. (LOND.), F.I.C. The Selection of Irish Free State Creamery Butter for Cold Storage	23
Australia, Regulating the Dairy Industry in	283
Beans , Field. By J. J. Hassett, A.R.C.SC.I.	163
Beet of the Future, Sugar	138
— Sugar, Crown Rot in	207
Besant, J. W., A.H.R.H.S., Keeper of the Botanic Gardens. Botanic Gardens : Origin, History and Development	173
Botanic Gardens : Origin, History and Development. By J. W. Besant, A.H.R.H.S., Keeper of the Botanic Gardens	173
Bounties, Export, in Finland	147
Boyle, C., M.A., PH.D., and J. J. Ryan, M.SC., A.R.C.SC.I. Experiments on Grass Silage	149
British Columbia, Colorado Beetle in	147
Butter, Irish Free State Creamery, the Selection for Cold Storage of. By G. Van B. Gilmour, PH.D. (LOND.), F.I.C., and Paul S. Arup, PH.D. (LOND.), F.I.C.	23
Carroll, J. , M.SC., D.I.C., A.R.C.SC.I., N.D.A., and E. McMahon, M.SC., B.AGR.SC., Department of Agricultural Zoology, University College, Dublin. Development of an Improved Type of Winter Spray for Orchards	48
Cereal Crops, Destruction of Weeds in, by means of Sulphuric Acid Spraying	143
Cold Storage, The Selection of Irish Free State Creamery Butter for. By G. Van B. Gilmour, PH.D. (LOND.), F.I.C., and Paul S. Arup, PH.D. (LOND.), F.I.C.	23
Colorado Beetle in British Columbia	147
— — in France	140
— — Menace : Swiss Regulations	141

	PAGE
Congested Districts, Land Reclamation in the. By John Kelly ...	183
Conroy, P., B.AGR.SC., N.D.A. Experiment : Potatoes <i>versus</i> Swedes in the Ration of Dairy Cows ...	101
Consumption of Margarine in Holland ...	142
Co-operative Egg Trade in Germany ...	145
Cows, Dairy, Potatoes <i>versus</i> Swedes in the Ration of. Experiment conducted by P. Conroy, B.AGR.SC., N.D.A. Instructor in Agriculture, Co. Westmeath ...	101
— Dairy, Sugar Pulp for ...	114
Crisis, Danish Agricultural ...	146
Crop Report, Final Fruit, 1933 ...	106
Crown Rot in Sugar Beet ...	207
Cultivation of Tomatoes ...	211
Dairy Cows, Potatoes <i>versus</i> Swedes in the Ration of. Experiment conducted by P. Conroy, B.AGR.SC., N.D.A., Instructor in Agriculture, Co. Westmeath ...	101
— Cows, Sugar Pulp for ...	114
— Industry in Australia, Regulating the ...	283
Danish Agricultural Crisis ...	146
Davidson, W. D., B.A., B.SC. History of Potato Varieties ...	57
Deasy, D., B.AGR.SC., University College, Dublin. Grass Silage ...	1
Decline of the Poultry Industry in South Africa ...	139
Department's Exhibit at Royal Horticultural Society Show ...	148
Destruction of Weeds in Cereal Crops by means of Sulphuric Acid Spraying ...	143
Development of an Improved Type of Winter Spray for Orchards. By J. Carroll, M.SC., D.L.C., A.R.C.SC.I., N.D.A., and E. McMahon, M.SC., B.AGR. SC., Department of Agricultural Zoology, University College, Dublin ...	48
Drew, Professor J. P., M.SC., A.R.C.SC.I., University College, Dublin. Grass Silage ...	1
Effect of Feeding-Stuffs on Quality of Eggs ...	141
Eggs, Effect of Feeding-Stuffs on Quality of ...	141

	PAGE
Egg-Laying Competition, National, 1933-34	221
Egg Trade in Germany, Co-operative	145
Exhibit at Royal Horticultural Society Show, Department's	148
Experiments on Grass Silage. By C. Boyle, M.A., PH.D., and J. J. Ryan, M.SC., A.R.C.SC.I., University College, Cork	149
Export Bounties in Finland	147
Feeding-Stuffs , Effect of, on Quality of Eggs	141
Feeding-Value of Potato Flakes and Slices, Relative	140
Field Beans. By J. J. Hassett, A.R.C.SC.I., Superintendent, Agricultural School, Clonakilty	163
Field Experiments, 1933	33
— — — — — 1934	196
Final Fruit Crop Report, 1933	106
Finland, Export Bounties in	147
Food Value of Oat Hulls. By E. J. Sheehy, F.R.C.SC.I., B.SC., University College, Dublin	167
France, The Colorado Beetle in	140
Fruit Crop Report, Final, 1933	106
Gardens , Botanic: Origin, History and Development. By J. W. Besant, A.H.R.H.S.	173
Garvey, Thomas. The Musk-rat in Saorstát Éireann	189
Germany. Co-operative Egg Trade in	145
Gilmour, G. Van B., PH.D. (LOND.), F.I.C., and Paul S. Arup, PH.D. (LOND.), F.I.C. Selection of Irish Free State Creamery Butter for Cold Storage	23
Grass Silage. By Professor J. P. Drew, M.SC., A.R.C.SC.I., G. F. O'Sullivan, M.SC., and D. Deasy, B.AGR.SC., University College, Dublin	1
— — — — — Experiments on. By C. Boyle, M.A., PH.D., and J. J. Ryan, M.SC., A.R.C.SC.I., University College, Cork	149
Hassett, J. J. , A.R.C.SC.I., Superintendent, Agricultural School, Clona- kilty. Field Beans	163
History of Potato Varieties. By W. D. Davidson, B.A., B.SC.	57

	PAGE
Holland, Consumption of Margarine in	142
Hulls, Oat, The Food Value of. By E. J. Sheehy, F.R.C.S.C.I., B.S.C. ...	167
J. H. N. Louping-ill	160
Kelly, John. Land Reclamation in the Congested Districts	183
Lafferty, H. A., F.R.C.S.C.I., Director, Seed Testing Station, Dublin. Report on Seventh International Seed Testing Congress, July, 1934	53
Land Reclamation in the Congested Districts. By John Kelly ...	183
Loan Fund, Abattoir, in Sweden	145
Louping-ill. By J. H. N.	160
Margarine, Consumption of, in Holland	142
Milk-Recording in Sweden, 1932-33	284
Musk-rat in Saorstát Éireann. By Thomas Garvey	189
McMahon, E., M.S.C., B.AGR.SC., and J. Carroll, M.S.C., D.I.C., A.R.C.S.C.I., N.D.A., Department of Agricultural Zoology, University College, Dublin. Development of an Improved Type of Winter Spray for Orchards	48
National Egg-Laying Competition, 1933-34	221
— Ploughing Championships. By J. O'Loan	29
Notes and Memoranda	138
— — — — —	283
Oat Hulls, The Food Value of. By E. J. Sheehy, F.R.C.S.C.I., B.S.C. ...	167
Official Document. Forty-fourth List	285
O'Loan, J. National Ploughing Championships	29
Orchards, Development of an Improved Type of Winter Spray for. By J. Carroll, M.S.C., D.I.C., A.R.C.S.C.I., N.D.A., and E. McMahon, M.S.C., B.AGR.SC., Department of Agricultural Zoology, University College, Dublin	48
O'Sullivan, G. F., M.S.C., University College, Dublin. Grass Silage ...	1
Pig-Recording in Sweden, 1932	143
Pig Supplies in U.S.A., Regulation of	144

	PAGE
Ploughing Championships, National. By J. O'Loan	29
Potato Flakes and Slices, Relative Feeding Value of	140
— Varieties, History of. By W. D. Davidson, B.A., B.Sc.	57
Potatoes <i>versus</i> Swedes in the Ration of Dairy Cows. Experiment conducted by P. Conroy, B.AGR.SC., N.D.A., Instructor in Agriculture, Co. Westmeath	101
Poultry Industry in South Africa, Decline of the	139
Pulp, Sugar, for Dairy Cows	114
Ration of Dairy Cows, Potatoes <i>versus</i> Swedes in the . Experiment conducted by P. Conroy, B.AGR.SC., N.D.A., Instructor in Agriculture, Co. Westmeath	101
Reclamation, Land, in the Congested Districts By John Kelly ...	183
Regulating the Dairy Industry in Australia	283
Regulation of Pig-Supplies in U.S.A.	144
Relative Feeding Value of Potato Flakes and Slices	140
Report of the Seed Propagation Division, 1933	82
Rothamsted Tests : A.I.V. Silage	138
Royal Horticultural Society Show, Department's Exhibit at	148
Ryan, J. J., M.Sc., A.R.C.SC.I., and C. Boyle, M.A., PH.D. Experiments on Grass Silage	149
Seed Propagation Division, Report of the, 1933	82
Seed Testing, Seventh International Congress, July, 1934. Report by H. A. Lafferty, F.R.C.SC.I., Director, Seed Testing Station, Dublin	53
Selection of Irish Free State Creamery Butter for Cold Storage. By G. Van B. Gilmour, PH.D. (LOND.), F.I.C., and Paul S. Arup, PH.D. (LOND.), F.I.C.	23
Seventh International Seed Testing Congress, July, 1934. Report by H. A. Lafferty, F.R.C.SC.I., Director, Seed Testing Station, Dublin	53
Sheehy, E. J., F.R.C.SC.I., B.Sc., University College, Dublin. The Food Value of Oat Hulls	167
Show, Royal Horticultural Society, Department's Exhibit at	148
Silage, A.I.V. : Tests at Rothamsted	138
— Grass. By Professor J. P. Drew, M.Sc., A.R.C.SC.I., G. F. O'Sullivan, M.Sc., and D. Deasy, B.AGR.SC., University College, Dublin ...	1

	PAGE
Silage, Experiments on Grass. By C. Boyle, M.A., PH.D., and J. J. Ryan, M.Sc., A.R.C.S.C.I., University College, Cork	149
South Africa, Decline of the Poultry Industry in	139
Sugar Beet, Crown Rot in	207
— of the Future	138
— Pulp for Dairy Cows	114
Sulphuric Acid Spraying, Destruction of Weeds in Cereal Crops by means of	143
Sweden, Abattoir Loan Fund in	145
Sweden, Milk-Recording in, 1932-33	284
— Pig-Recording in, 1932	143
Swedes, Potatoes <i>versus</i> , in the Ration of Dairy Cows. Experiment conducted by P. Conroy, B.AGR.SC., N.D.A., Instructor in Agriculture, Co. Westmeath	101
Swiss Regulations : Colorado Beetle Menace	141
Tomatoes , Cultivation of	211
U.S.A. , Regulation of Pig-Supplies in	144
Weeds in Cereal Crops, Destruction of, by means of Sulphuric Acid Spraying	143
Winter Spray for Orchards, Development of an Improved Type of. By J. Carroll, M.Sc., D.I.C., A.R.C.S.C.I., N.D.A., and E. McMahon, M.Sc., B.AGR.SC., Department of Agricultural Zoology, University College, Dublin	48

DEPARTMENT OF AGRICULTURE

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VOLUME XXXIV.

INDEX

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CONTENTS.

	PAGE
Mineral Metabolism in the Calf and the Addition of Inorganic Minerals to the Calf's Diet. By E. J. Sheehy, F.R.C.Sc.I., B.Sc., and B. J. Senior, M.Sc., Animal Nutrition Department, University College, Dublin	1
Report of the Seed Propagation Division, 1934	33
Saved Potatoes from Bog Land. By W. D. Davidson, B.A., B.Sc. ...	48
Vernalization, its Principles and Practice. By M. Caffrey and P. T. Carroll, University College, Dublin	53
The Effects of Tar on the Germination of Wheat Seed. By H. A. Lafferty, F.R.C.Sc.I.	63
Field Experiments, 1935	73
Final Fruit Crop Report, 1935	86
Report of the Seed Propagation Division, 1935	100
The Raspberry Beetle (<i>Byturus tomentosus</i>) and its Control. By J. Carroll, M.Sc., D.I.C., A.R.C.Sc.I., N.D.A., Agricultural Zoology Department, University College, Dublin	119
Tomato Variety Trial at the Albert Agricultural College, Glasnevin, 1935. By G. O. Sherrard, A.R.C.Sc.I., and J. Usher	124
Crown Rot in Sugar Beet	131
Warble Fly—Experiments, 1935	133
Report on the National Egg-Laying Competition, 1934-35	137
Notes and Memoranda:	208





Third International Congress of Soil Science, 1935—Annual Congress of the National Veterinary Medical Association of Great Britain and Ireland, 1935—Third Imperial Botanical Conference, 1935—Sixth International Botanical Conference, 1935—Sixth International Congress of Entomology, 1935—Fourth Imperial Entomological Conference, 1935—Seed Potato Exhibit at the Royal Horticultural Society's Show, National Hall, Olympia, London, 25-27th September, 1935—Meeting of the International Commission of Agriculture, 1935—Second International Congress of Rural Engineering, 1935—Potato Production in the Northern Hemisphere—International Standardizing of Herdbooks and Milk Recording—Export Premiums in Finland—State-Aid for the German Poultry Industry—Danish Beef Scheme—Prevalence of Warble Fly in Denmark—Butter Production in Denmark, 1933—Netherlands Production of Potato By-Products, 1933-34—Machine-Milking v. Hand-Milking—The Use of Skim-Milk as Food—Growing Flax and Hemp in Germany—Sixth World's Poultry Congress—Danish Pig-Killings, 1931-35—British Sugar Beet Industry: Ten Years' Work—Scheme for Eliminating Tuberculous Cattle in France—Cow-Testing in Denmark, 1933-34.

Official Document	223
--------------------------	-----

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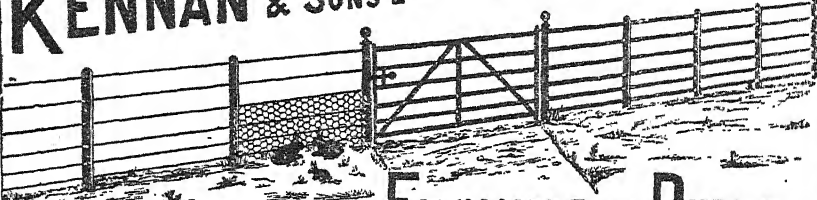
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MINERAL METABOLISM IN THE CALF AND THE ADDITION OF INORGANIC MINERALS TO THE CALF'S DIET.

By E. J. SHEEHY, F.R.C.Sc.I., B.Sc. and B. J. SENIOR, M.Sc., Animal
Nutrition Department, University College, Dublin.

INTRODUCTION.

In a previous issue of this journal (1) the writers gave the results of a series of experiments on the mineral metabolism of the pig and the addition of inorganic minerals to the pig's diet, and made certain recommendations for the guidance of practical feeders in connection therewith. A somewhat similar investigation has been called for in the case of the calf. Much useful work has been accomplished elsewhere in this connection, but the conclusions are, to a certain degree, confusing. The utilisation of minerals by the calf, as by other animals, depends on the completeness of the diet in respect of the necessary mineral ingredients and the other dietary essentials, more particularly vitamin D which is so closely associated with mineral metabolism. Recognition of this fact is always necessary in the prosecution of experimental work bearing on the retention of calcium and phosphorus, and a discussion on mineral balance must bear reference to the level of the vitamin D in the diet.

HISTORY.

The occurrence of a pronounced mineral shortage in the diet of the calf has been much less frequent than in the pig, and consequently less attention has been focussed on this aspect of the nutrition of the calf. Obviously this is due to the fact that milk and hay or green fodder, which are foods rich in minerals, particularly in calcium and phosphorus, form part of its diet. Yet it was shown as early as 1897 (2), and on numerous occasions later, that calves fail to make normal progress on milk alone, while in the case of fodder the quantity consumed determines its supplementary effect on the remainder of the diet.

Of the increase in weight made by a growing calf, approximately $1\frac{3}{4}$ per cent. is in the form of lime (calcium oxide), so that an increase of $1\frac{1}{4}$ pounds live weight per day would represent a daily retention of lime of about $\frac{1}{8}$ ounce. On the assumption of 80 per cent. retention from milk, the daily lime requirement of a calf making the above increase in weight would be supplied by $1\frac{1}{2}$ gallons. Minerals from other sources are retained to the extent of only 40 to 50 per cent. and, on a 45 per cent. retention basis, foods other than milk would require to supply approximately $\frac{3}{4}$ ounce of lime daily in order that the calf may increase $1\frac{1}{4}$ pounds in weight and maintain the normal percentage of lime in its body. Approximately the same amount of phosphorus (phosphorus pentoxide) would be required. The greater

part of the calcium and phosphorus in the body is to be found in the bone, in which they occur in the proportions found in tricalcic phosphate, the ratio remaining constant in the immature and mature animal and in both normal and rachitic bone (3). The actual percentage of calcium and phosphorus in bone varies only very slightly with increase in age (4) till adolescence is reached.

For the utilisation of minerals calves require a considerable quantity of vitamin D, in the absence of which, a pronounced pathogenic condition is developed (5) (6) (7) (8) (9). The calcium and phosphorus in the blood serum is lessened and the percentage of ash in the bone is below normal, as is also the breaking strength of the bones, which in extreme cases become bent and markedly rickety. The occurrence of convulsive fits is an accompaniment of these conditions. Symptoms of this nature occur when calves are fed for a prolonged period, in the absence of sunlight, on milk, cereals, oil cake and salt. They may be prevented by the addition to such a diet of cod liver oil or a sufficiency of good hay or irradiated ergosterol or by exposing the animals to sunlight or artificial irradiation (9), (10). Two to two-and-a-half pounds of good sun-cured hay afforded protection in the American experiments referred to, but a very much greater quantity of hay from other latitudes, and made up under other conditions, may be necessary.

When there is a sufficiency of vitamin D from any source, the addition of the vitamin from other sources is not followed by any beneficial results. Thus, according to Rupel and his collaborators (8) the addition of cod liver oil or exposure to light gives positive results when no hay is fed, while negative results are obtained when hay already forms part of the diet. Gullickson and Eckles (11) fed calves kept in complete darkness from the age of 1 week to 2 years on the usual farm diet including hay, and so far as could be judged by the usual criteria the absence of light was without effect.

Numerous experimenters have tested the use of cod liver oil fed to calves reared under general conditions of farming practice. At Wisconsin (12) cod liver oil effected no improvement on a ration of grain, hay, and skim milk. Nor was the feeding of cod liver oil, during the post-milk stage of growth, to calves at the New Jersey Station (13) effective in improving the rate of growth. Isaachsen (14) similarly found no improvement in the progress of calves, receiving separated milk, cereals and hay, as a result of adding cod liver oil to the diet. A like result issued from an experiment by Iguchi and Mitamura (15) in which the effect of adding cod liver oil to the diet of calves receiving hay, silage, cereals and oil cake was determined.

Not alone are minerals and vitamin D essential for growth, but if optimum results are to be obtained, the mineral constituents must bear a certain relationship to one another. According to McGowan (16) an excess of calcium neutralises the hydrochloric acid of the gastric juice and by precipitating the phosphorus as tricalcic phosphate, hinders its assimilation. Crowther and Wright (17) working with pigs came to the conclusion that

lime in a ration beyond a certain proportion is definitely injurious. Meigs and his co-workers (18) found that, in the dairy cow, phosphorus assimilation may be interfered with by excess of calcium, and that 2 or more parts of calcium to 1 of phosphorus constitutes excess. Conversely an excess of phosphorus over calcium is also unfavourable. When for instance, McCandlish (5) attempted to rear calves on milk, cereals, and oil cake he found more rapid deformation of bone than when milk constituted the sole diet. Apparently one explanation of this result lies in the derangement of the calcium to phosphorus ratio. Cereals are much richer in phosphorus (P_2O_5) than in calcium (CaO) and, for the balancing of the mineral ingredients in a ration of hay, cereals and oil cake, the question arises as to whether ground limestone (calcium carbonate) or bone flour (calcium phosphate) is the better. Anderson, McCampbell and Marston (19) report in favour of the former, though there is abundant evidence that as a source of supplementary calcium both are more or less similar, provided the optimum calcium to phosphorus ratio of the diet is not departed from too much. McGowan (20) found that in chickens, when the calcium (CaO) to phosphorus (P_2O_5) ratio of the food is as 1 to 6, osteoporosis is produced even in the presence of abundance of vitamin D. On the other hand, his experience was that when the calcium (CaO) to phosphorus (P_2O_5) ratio in the food was as $2\frac{1}{2}$ to 1, definite rickets was produced if vitamin D were absent from the diet, while with the same proportions of calcium and phosphorus rickets was prevented by the presence of vitamin D.

Whether from a beneficial effect on the balance of the mineral ingredients, or by way of supplying actual mineral deficiencies, much evidence is forthcoming in favour of the addition of certain minerals to the diet of the calf. Orr and Crichton (21) report most favourable results from the addition of a complex protein and mineral supplement to the ration of calves fed from the seventh week onwards on hay, oats and linseed meal. Even after 18 weeks on milk calves subsequently put on the hay, oats and linseed meal diet failed to make the same weight increase as animals receiving in addition thereto the protein and mineral supplement. Mead and Regan (22) found that the addition of the ash of alfalfa hay prevented the development of the pathological condition of the skeleton which otherwise took place in calves fed on cereals, oil cake, salt and cod liver oil. Chaudhuri (23) fed a mineral mixture to stunted calves receiving straw and concentrates, and obtained an appreciable increase in weight increment as compared with calves on the straw and concentrate diet. The successful replacement of some or all of the separated milk in the diet of the calf by a mixture of proteins, ground limestone, bone flour and salt has been demonstrated by Maynard, Norris and Krauss (24) and by Bender and Bartlett (25).

On the other hand, various experiments on record go to show that, even in the absence of milk after the sixth or seventh week of age, a calf may make normal growth without the addition of inorganic minerals: indeed

the experience of many investigators has been that the addition of minerals had no useful effect. Fraser and Brand (26), Fohrman (27) and Mead (28) reared calves satisfactorily after eight weeks of age on grain and good hay. Eckles and Gullickson (29) secured gains of from 1.2 to 1.4 pounds daily with calves, from the 60th to the 180th day, fed on hay *ad lib.* together with cereals and oil cake. The addition of calcium carbonate by Zaykowsky and Krasnokutska (30) to the diet of calves, from three months old onwards, receiving farm dietary effected no increase either in growth or in weight increment. In the case of more advanced calves, *i.e.* 4 to 6 months old, receiving cereals, oil cake, salt and either hay or green silage, the addition to the ration of ground limestone, steamed bone flour, iodine, copper and iron salts proved definitely ineffective (31) (32) (33) (34). Mead, Regan and Bartlett (35) weaned 5-weeks-old calves from milk and thenceforward fed them on meals, salt and hay. The addition to this diet of limestone and rock phosphate produced "no outward effect" on health, growth or increase in weight, though the authors state that animals so fed were less sleek and showed less "bloom" than similar calves which received milk throughout the period of the experiment. Similar results were obtained by Elting and La Master (36). From the age of 60 days onwards calves which were limited to a diet of maize, oats, cotton seed meal, salt and hay made very satisfactory growth. Yet, in comparison with animals which continued to receive milk, the bones of the experimental calves were less dense and possessed less breaking strength. In the opinion of these writers, good quality hay is most important in calf feeding especially when weaning from milk occurs at an early age. In connection with the age up to which milk should form part of a calf's diet, Eckles and Gullickson (29) came to the opinion that, with calves receiving maize, bran, linseed cake and hay, the improvement in gain and in general appearance effected by feeding milk beyond the tenth week of life is so little that the extra expense of the milk is not justified. An experiment by Berry (37) led to somewhat similar conclusions. Eight-weeks-old calves were put on a basic diet of bran, maize, oats, linseed cake and hay, and, to experimental lots skim milk powder at the rate of 22 per cent. and 36 per cent. of the grain ration was added. The average increase in weight of the control group and of the 22 and 36 per cent. milk groups over a subsequent period of 18 weeks was 1.30, 1.38 and 1.49 pounds per day respectively. At the end of the experiment the lots were similar in general appearance. Discordant results have been obtained from the feeding of iodine to calves at different centres, due possibly to the varying content of iodine in the basic foods used; but Krauss and Monroe (38) got no increase in the rate of growth of calves which were fed on iodised milk as compared with normal milk. Among the many ill effects of confining calves beyond the normal weaning age to a diet of milk alone is the development of an anaemic condition. The ordinary meal and fodder supplements of a milk diet are, however, rich enough in iron to compensate for the deficiency of milk therein. For instance, Cannon (7) found that hay or straw given in addition to milk prevented the development of anaemia in the calf.

EXPERIMENTAL.

The investigation reported on in this paper has been conducted at the Animal Nutrition Department, University College, Dublin, over a period of six years. It has consisted of a series of group experiments, together with metabolism tests involving the determination of the retention of certain mineral elements by individual calves. The group experiments were conducted on calves purchased each spring and reared in the usual way on whole milk for three weeks followed by separated milk prepared by reconstituting separated milk powder which, as in the case of powdered buttermilk is of similar food value to the fresh fluid product (39) (40) (41). From the third week onwards hay was provided, and dry meals consisting of a mixture of cereals, cereal by-products, and oil cake were offered. The quantity of hay and meals consumed for the first few weeks was quite small, but by the seventh week of life, when the experiments started and the feeding of milk ceased, the calves had become accustomed to eating a moderate ration of both.

GROUP EXPERIMENTS.

Three breeds of animal were used, namely cross-bred Shorthorn, Hereford and Aberdeen Angus. The usual precautions with regard to age, sex, breed, weight and appearance were observed in the distribution of the calves among the groups. The animals were housed in compartments lighted from the north only, but they were allowed out to adjoining open yards for a few hours daily.

GROUP EXPERIMENT I.—*To determine the effect of the addition of common salt (sodium chloride), lime, iron and iodine to a diet of good hay, cereals, oil cake and sugar pulp.*

Twenty-four calves, approximately seven weeks old, were divided into four groups and received the following basic ration—

Good quality hay			
*Sugar pulp (very small allowance)			
Meals—bran	..	20	parts
rolled barley	..	30	„
flaked maize	..	30	„
linseed cake	..	20	„

In addition mineral supplements were fed as follows—

Group I.—none			
Group II.—salt 1 per cent. of the meal mixture			
Group III.—salt 1 „ „ „			
sterilised bone flour	1	per cent.	of the meal mixture
ground limestone	1	„	„ „
Group IV.—salt 1 per cent. of the meal mixture			
sterilised bone flour	1	per cent.	of the meal mixture
ground limestone	1	„	„ „
iron oxide	0.1	„	„ „
potassium iodide	0.01	„	„ „

*Molassed dried sugar beet pulp.

All groups got the same daily allowance of hay, sugar pulp and meals. At the start each animal was consuming $1\frac{1}{2}$ lb. hay, $1\frac{1}{2}$ lb. meals and $\frac{1}{2}$ lb. sugar pulp daily. The sugar pulp was fed at the same level throughout, but the hay and meals were gradually raised as required, each reaching 4 lb. daily per calf in 96 days from the beginning of the experiment. The test continued for 16 weeks.

Table I gives the weights and gains while Figure I graphically records the rate of increase of the individual animals in the four groups.

In each group some calves, namely 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, received cod liver oil daily—1 ounce each—throughout the period of the experiment, while the remainder got a similar quantity of linseed oil.

The object of the oil feeding was to find whether, under the conditions of the experiment, any of the rations fed was deficient either in vitamin A or D. Vitamin A was supplied by yellow maize and hay, so that there actually was very little likelihood of a vitamin A shortage. For the purpose of supplying vitamin D to the calf it has been shown (8) that while 20 ccs. of cod liver oil daily was insufficient, 40 ccs., *i.e.* approximately $1\frac{1}{2}$ ounces, was ample. If $1\frac{1}{2}$ ounces sufficed when there was no other source of vitamin D, then 1 ounce should prove sufficient under conditions where hay and sunlight were available. As far as the other vitamin requirements are concerned Bechdel, Eckles and Palmer (42) have shown that the calf can synthesise vitamin B, while other investigators (43) (44) have demonstrated that the calf is able to make normal growth in the absence of vitamin C from the diet.

TABLE I.

WEIGHTS AND GAINS.

Group	No. of calf	Initial weight	Final weight	Gain in 16 weeks	Weekly gain	Average weekly gain by groups
I. Basic		lb.	lb.	lb.	lb.	lb.
	1	144	286	142	8.9	
	2	111	265	154	9.6	
	3	142	282	140	8.8	
	4	118	269	151	9.4	9.1
	5	98	223	125	7.8	
	6	107	269	162	10.1	
II. Basic + salt	7	120	274	154	9.6	
	8	124	275	151	9.4	
	9	116	270	154	9.6	9.1
	10	118	255	137	8.6	
	11	122	248	126	7.8	
	12	142	290	148	9.8	
III. Basic + salt and lime	13	123	276	153	9.6	
	14	100	230	130	8.1	
	15	109	252	143	8.9	9.0
	16	128	277	149	9.3	
	17	121	256	135	8.4	
	18	131	289	158	9.9	
IV. Basic + salt lime, iron and iodine	19	132	282	150	9.4	
	20	126	277	151	9.4	
	21	104	242	138	8.6	9.3
	22	116	277	161	10.1	
	23	129	267	138	8.6	
	24	147	304	157	9.8	

Result.—There was no significant difference between the comparable animals in the four groups either as regards increase in weight during the period of test or in body appearance at its termination, nor did any difference appear as a result of feeding cod liver oil as compared with linseed oil. Apparently the good quality hay in this experiment supplemented the meals with ample supplies of minerals, and, under the conditions of the experiment, the inorganic minerals and the cod liver oil fed served no obvious useful purpose.

GROUP EXPERIMENT II.—*To determine the effect of the addition of common salt and lime to a diet of good hay, roots, cereals and oil cake.*

In order to repeat part of Experiment I, 16 calves of about 7 weeks of age were divided into two groups. They were all fed the following basic diet—

Good quality hay

Roots

Meals—bran .. 15 parts
 flaked barley .. 65 "
 linseed cake .. 10 "
 earth nut cake 10 "

In addition group II received a mineral supplement made up of equal parts of common salt, steamed bone flour and ground limestone fed at the rate of 3 per cent. of the meals supplied, while group I got the basic ration only.

Both groups got the same daily allowance of hay, roots and meals. Only a few pounds of roots per beast were given. $1\frac{1}{2}$ pounds of hay and $1\frac{1}{2}$ pounds of meals were being consumed when the experiment began. Both were gradually increased: in 60 days from the start each calf was eating 3 pounds of meals daily, and in 100 days the daily hay allowance per individual was up to 4 pounds. The test continued for 21 weeks.

Table II gives the weights and gains and Figure II the graphical record of the increase in weight of each calf in both groups.

Calves number 2, 4, 6, 8, 10, 12, 14 and 16 received one ounce of cod liver oil daily while the remainder of each group got a similar quantity of linseed oil.

TABLE II.
WEIGHTS AND GAINS.

Group	No. of calf	Initial weight	Final weight	Gain in 21 weeks	Weekly gain	Average weekly gain by group
		lb.	lb.	lb.	lb.	lb.
I. Basic	1	154	352	198	9.4	9.0
	2	139	353	214	10.2	
	3	148	337	189	9.0	
	4	140	308	168	8.0	
	5	125	315	190	9.0	
	6	168	385	217	10.3	
	7	137	306	169	8.0	
	8	128	304	176	8.4	
II. Basic + salt and lime	9	157	352	195	9.3	9.1
	10	130	296	166	8.0	
	11	121	308	187	9.0	
	12	126	319	193	9.2	
	13	120	307	187	9.0	
	14	132	320	188	9.0	
	15	136	338	202	9.6	
	16	141	358	217	10.3	

Result.—Neither in the increase in weight throughout the experiment nor in the appearance of the animals at its termination was there any apparent difference between the two groups. Cod liver oil showed no superiority over linseed oil when fed under the circumstances of this experiment.

GROUP EXPERIMENT III.—*To determine the effect of adding common salt and lime to a diet of medium quality weathered rye grass hay, cereals, sugar pulp and oil cake.*

Seventeen calves of approximately seven weeks of age were divided into 3 groups, all of which received the following basic ration—

Hay		
Sugar pulp (very small allowance)		
Meals—Bran	..	25 parts
Rolled barley	25	..
Flaked maize	..	25 ..
Linseed cake	}	25 ..
Earth nut cake		

In addition, group II was fed salt at the rate of 1 per cent. of the meals given, while group III received salt 1 per cent. and ground limestone 2 per cent. of the meal allowance. The individual allowance of hay, pulp and meals was the same in all groups.

At the beginning of the experiment each calf was eating $1\frac{1}{2}$ lb. hay, $1\frac{1}{2}$ lb. meals and $\frac{1}{2}$ lb. sugar pulp. The quantity of sugar pulp remained unaltered throughout. The meals were increased up to 3 lb. daily, a level which was reached 80 days after the start of the experiment, while the hay was gradually raised to a level of 4 lb. daily, which was reached in 60 days from the start. The experiment continued for 19 weeks.

Table III gives the weights and gains and Figure III gives a graphical record of the increase in body weight over the period.

Calves number 1, 2, 4, 7, 8, 11, 12, 13 and 14 received cod liver oil at the rate of 1 ounce per day, while the remainder of each group got a like quantity of linseed oil.

TABLE III.
WEIGHTS AND GAINS.

Group	No. of calf	Initial weight	Final weight	Gain in 19 weeks	Weekly gain	Average weekly gain by group
		lb.	lb.	lb.	lb.	lb.
I. Basic	1	106	225	119	6.3	8.6
	2	123	329	206	10.8	
	3	105	247	142	7.4	
	4	110	300	190	10.0	
	5	114	301	187	9.8	
	6	103	236	133	7.0	
II. Basic + salt	7	116	328	212	11.2	9.5
	8	111	250	139	7.3	
	9	125	287	162	8.5	
	10	121	290	169	8.9	
	11	112	330	218	11.5	
III. Basic + salt and lime	12	127	324	197	10.4	10.0
	13	131	317	186	9.8	
	14	106	303	197	10.4	
	15	111	288	177	9.3	
	16	107	288	181	9.5	
	17	97	299	202	10.6	

Result.—Taken as a whole, groups II and III made appreciably more

progress than group I, but yet each of three animals in group I thrive as well as the average of groups II and III. In appearance, the animals of group I, during the latter half of the experiment, looked less well than those of the other two groups: this was especially marked in the coat which, in group I, lacked the "bloom" of that of the other groups. Apparently the addition of salt had an effect which, though not so evident from the weight record, was noticeable in the appearance of the animals. Groups II and III, which received a supplement of salt and of salt and lime respectively, appeared to thrive equally during the period of the test.

Again cod liver oil showed no superiority over the non-vitamin oil under the conditions of this experiment.

GROUP EXPERIMENT IV.—*To determine the effect of adding common salt and lime to a diet of poor quality severely-weathered hay, cereals, sugar pulp and oil cake, the hay being fed in lesser quantity than the meals.*

Eighteen calves, approximately 7 weeks old, divided into 3 groups, were fed the following basic diet—

Hay, which had been weathered in the field for 3 weeks.	
Sugar pulp (very small allowance)	
Meals—bran	.. 25 parts
flaked maize	.. 50 ,,
linseed cake	.. 25 ,,

Group I got no additional food, while group II received salt at the rate of 1 per cent. of the meals consumed, and group III got salt 1 per cent. and ground limestone 2 per cent. of the meals. The individual allowance of hay, pulp and meals to the animals in the three groups was similar throughout.

Sugar pulp was not fed till the 50th day of test, after which each animal received $\frac{1}{2}$ lb. daily to the end. At the start of the experiment the calves were eating $1\frac{1}{2}$ lb. hay and $1\frac{1}{2}$ lb. meals daily. Both were gradually increased till in 90 days $3\frac{1}{2}$ lb. hay were fed. The hay was not increased beyond that figure, but the meals rose to 4 lb. daily by the 100th day. The experiment continued over 23 weeks.

Table IV gives the weights and gains, and Figure IV shows graphically the increase in body weight.

TABLE IV.

WEIGHTS AND GAINS.

Group	No. of calf*	Initial weight	Final weight	Gain in 23 weeks	Weekly gain	Average weekly gain by group
		lb.	lb.	lb.	lb.	lb.
I. Basic	1	149	279	130	5.7	8.8
	2	180	412	232	10.1	
	3	123	315	190	8.3	
	4	142	304	162	7.0	
	5	211	480	269	11.7	
	6	153	390	232	10.1	
II. Basic + salt	7	157	389	232	10.1	9.3
	8	140	323	183	8.0	
	9	126	328	202	8.8	
	10	136	345	209	9.1	
	11	173	385	212	9.2	
	12	167	409	242	10.5	
III. Basic + salt and lime	13	117	301	184	8.0	9.3
	14	136	333	197	8.6	
	15	141	320	179	7.8	
	16	111	292	181	7.9	
	17	137	494	357	13.3	
	18	154	393	239	10.4	

Result.—While the average gain of group I was less than that of the other two groups, it is clear that three of the calves of that group thrived equally well even with the better animals of groups II and III. It is significant, however, that such a large percentage of group I, both in this experiment and in group experiment III, made very poor progress. There was no difference in the weight records of groups II and III.

Differentiation between the three groups appeared, however, in respect of appearance and appetite, especially during the last 8 weeks of the experiment. The animals of group III showed good "bloom" of coat; those of group II, while looking well, may not have had quite the same "bloom" as those of III, and group I was definitely inferior to II and III in this respect. The appetite of group III was definitely brisker than that of the other two groups, while that of II was slightly, but not very appreciably, better than I.

GROUP EXPERIMENT V.—*To determine the effect of adding common salt and lime to a diet of poor quality severely-weathered hay, cereals, sugar pulp and oil cake, the meals being limited in quantity and the hay fed very liberally.*

Twelve calves, approximately 7 weeks old, were divided into 3 groups and put on the following basic ration—

Hay, which had been weathered in the field for 3¹/₂ weeks.
 Sugar pulp (very small allowance)
 Meals—maize meal .. 50 parts
 oats .. 25 „
 bran .. 10 „
 earth nut cake .. 15 „

In addition, group II received salt at the rate of 1 per cent. of the meals fed, while group III got salt 1 per cent. and ground limestone 2 per cent. of the meals. Group I got no supplement. All animals got the same daily allowance of hay, pulp and meals.

At the start of the experiment the animals were each consuming 1¹/₂ lb. hay and 1¹/₂ lb. meals daily. The meals were increased till on the 16th day of the test they reached 2 lb., at which figure they remained throughout the rest of the experiment. By the limitation of the meals the animals were induced to consume a large allowance of hay, the daily quantity fed reaching 6 lb. per beast by the 100th day of the test. Sugar pulp was fed at the rate of ¹/₂ lb. per beast daily throughout the experiment. The duration of the experiment was 18 weeks.

Table V gives the weights and gains and Figure V gives a graphical record of the body weight increase.

Animals number 3, 4, 7, 8, 11 and 12 were each given 1 ounce daily of cod liver oil.

TABLE V.

WEIGHTS AND GAINS.

Group	No. of calf	Initial weight	Final weight	Gain in 18 weeks	Weekly gain	Average weekly gain by group
		lb.	lb.	lb.	lb.	lb.
I. Basic	1	158	322	164	9.1	7.8
	2	140	229	89	5.0	
	3	147	294	147	8.2	
	4	161	323	162	9.0	
II. Basic + salt	5	161	269	106	6.0	7.8
	6	155	290	135	7.5	
	7	160	343	183	10.2	
	8	119	256	137	7.6	
III. Basic + salt and lime	9	155	299	144	8.0	8.0
	10	180	277	147	8.2	
	11	141	305	164	9.1	
	12	156	282	126	7.0	

Result.—Owing to the restriction of the meals the rate of increase in

weight was slow in all groups, but there appeared little difference between the individual groups in this respect.

During the latter half of the experiment the animals of group III consumed their daily allowance of food much more readily than those of I or II. Group III would have consumed more food but they were limited to that quantity which satisfied the appetite of group I. The appetite of group II was brisker than that of group I, but was not up to the level of group III which was appreciably better.

There was little difference in appearance of coat in the three groups towards the end of the test. At the time of shedding the winter coat, however, group III looked superior to the others because of the greater readiness with which the change from old to new coat of hair was effected in this group.

It will be noted that the effect of adding salt or salt and lime was less pronounced in this experiment than in experiment IV, the difference being due no doubt to the very considerable disparity in the daily consumption of hay, the chief source of salt and lime, by the animals in the two experiments. The maximum in the case of this experiment reached 6 lb., while in experiment IV it never exceeded $3\frac{1}{2}$ lb. daily.

No advantage was gained by feeding cod liver oil under the conditions of this experiment.

GROUP EXPERIMENT VI.—*To compare separated milk with other sources of minerals for calves.*

Sixteen calves, approximately 7 weeks old, were divided into four groups and fed on a basic ration of—

Hay—good quality	
Roots	
Meals—crushed oats	.. 3 parts
linseed cake	.. 1 ..

The hay was fed according to appetite, and the meals, which were consumed at the rate of $1\frac{1}{2}$ lb. per day at the start of the test, were soon raised to 2 lb. per day and maintained at that figure. Only a small quantity of roots was fed. The daily allowance of the basic ration was the same for all animals in the experiment.

In addition to the above foods supplements were given as follows—

Group I. Separated milk, $1\frac{1}{2}$ gallons per animal daily

Group II. " " $\frac{1}{2}$ " " "

and in addition 1.2 lb. of the following mixture

3 parts earth nut meal	} per animal daily
1 .. wheat	
1 .. oat meal	

together with 0.08 lb. of the following mixture—

sterilised bone flour	} per animal daily
precipitated chalk	
salt	

(The above additions to the $\frac{1}{2}$ gallon of separated milk contain approximately the same starch equivalent and protein equivalent and the same quantity of salt and lime as 1 gallon of separated milk, so that each animal in group II received the equivalent of $1\frac{1}{2}$ gallons of separated milk daily).

Group III. Separated milk, $\frac{1}{2}$ gallon per animal daily,
plus 1.2 lb. of the following mixture—

3 parts earth nut meal	} per animal daily
1 part wheat	
1 part oat meal	

and salt

(Group III received the equivalent of $1\frac{1}{2}$ gallons of separated milk in the way of starch equivalent, proteins, and salt, the supplementary lime feeding being withheld).

Group IV. Separated milk—none

2 lb. of the following mixture—

2 parts fish meal	} per animal daily
1 part earth nut meal	
2 parts wheat	
2 parts oat meal	

(Group IV received the approximate starch equivalent, protein equivalent, salt and lime—of $1\frac{1}{2}$ gallons of separated milk).

The experiment continued for 18 weeks, during which time the average weekly individual gains were as shown in Table VI.

TABLE VI.

Group I	10.3 lb.
„ II	10.0 lb.
„ III	10.0 lb.
„ IV	10.1 lb.

Result.—There was no significant difference in the increase in weight made by the four groups, and though at the termination of the experiment the “bloom” of the coat and the general appearance of the animals in group I appeared somewhat superior to that of the other groups, the difference was very small and indefinite.

BALANCE EXPERIMENTS.

Balance experiments were conducted on calves of 3 to 6 months old housed in the metabolism crates previously described (45). Prior to the metabolism experiments the animals were accommodated and treated in

the same fashion as those in the groups. The experiments were conducted over 3 years, and therefore the use of the same animals for all the tests was not found practicable. Each test involved two consecutive feeding periods, *viz.*, one on the control diet followed by a second on the control diet plus the supplement used. For these two feeding periods the same animals were, of course, used. Actually two or more tests were performed on the same animals, but this fact is of no significance because each test formed in itself a complete experiment and is reported separately. Each experiment was performed in duplicate, *i.e.* two animals were housed in the metabolism crates simultaneously, so that the results obtained from one formed a check on those from the other.

In each experiment the control diet was fed for a period of 20 days, during the last 12 of which, samples of the faeces and urine were collected for analysis. Immediately afterwards, the control plus the supplement, was fed for another 20 days, during the last 12 of which, again, samples of faeces and urine were collected for analysis. Prior to the control diet period it was found necessary to determine experimentally the quantity of food which the calves would consume daily in the metabolism crate. While not quite as large as the consumption of similar animals under the conditions of the group experiments, yet the calves in the crates in each experiment ate considerably more than would be necessary for maintenance. Because of the rapid growth and the increasing appetite of the calves it sometimes became necessary to increase the total food allowance during the second 20 days period over that of the first 20 days period. The proportions of the various items in the rations were, however, kept constant.

Previous to each experimental period, the daily meal rations therefor were made up and placed in tin boxes. As the ingredients were weighed out, samples were taken, the moisture contents of which were forthwith determined. Representative samples were preserved for further analysis. A suitable quantity of the hay to be used was also intimately mixed, and the daily portions weighed into bags. A large representative sample was taken, which was then put through a chopping machine. The chopped material having been mixed once more, samples of about 2 kilograms weight were placed in muslin bags and dried in a current of hot air until constant in weight. These residues were afterwards ground down in a mill to a very fine condition, again mixed and subsequently analysed.

The faeces were collected at the end of each 24-hour period. They were then weighed, thoroughly mixed and a definite proportion placed in an air-tight glass jar which was kept in a cool place. The jar was almost completely filled by the sample. At the end of every 3 days these daily aliquots were well mixed and a representative sample taken for moisture and nitrogen determination. The latter determination was done five times on each sample of fresh faeces. The residues from the moisture determinations were used in the making of a composite sample of faeces for subsequent analysis. Separate analyses of faeces were made corresponding to the

first and to the second half of the 12-day collection period, and good agreement was obtained in all cases between the total amounts excreted in each half-period.

The urine was collected at the same time each day as were the faeces. Prior to withdrawing the jar from beneath the leaden funnel, the floor of the crate and, consequently, the funnel was washed down with a measured quantity of distilled water. The contents of the jar were then thoroughly mixed and an aliquot sample taken. These samples were added to a bottle containing a little toluene, and at the end of each 3 days the combined samples were analysed.

Calcium was determined in food, faeces and urine (diluted with wash-water) by ashing a suitable quantity, precipitating as oxalate, and titrating with permanganate. For phosphorus determinations the Richards and Godden modification of the Pemberton-Neumann method was found satisfactory (46).

BALANCE EXPERIMENT I.—*To determine the effect on the calcium and phosphorus retention of adding cod liver oil to a diet of good quality hay, cereals, oil cake, common salt and ground limestone.*

Particulars of the daily ration consumed by each calf during each of the two periods of the experiment, and of the calcium (CaO) and phosphorus (P_2O_5) therein are given in table VII.

TABLE VII.

	Control diet			Control diet plus cod liver oil		
	Total quantity consumed (grams)	Total calcium (CaO) consumed (grams)	Total phosphorus (P_2O_5) consumed (grams)	Total quantity consumed (grams)	Total calcium (CaO) consumed (grams)	Total phosphorus (P_2O_5) consumed (grams)
Hay—good quality ..	2,700	22.77	14.86	3,000	25.13	16.40
Meals :						
maize ..	1,350	2.62	19.04	1,500	2.91	21.17
bran ..	180			200		
earth nut cake ..	270			300		
Salt (sodium chloride)	18	—	—	20	—	—
Limestone ..	36	19.80	—	40	22.00	—
Cod liver oil ..	—	—	—	47	—	—
Total	4,554	45.19	33.90	5,107	50.04	37.57

The excretion of calcium and of phosphorus respectively per day in the faeces and urine was determined, the difference between the amount consumed and that excreted being the quantity retained by the body. Table VIII shows the retention per day and, for purposes of comparison therewith, the consumption per day, of calcium and phosphorus of each calf.

TABLE VIII.

Animal		Control diet		Control diet plus cod liver oil	
		CaO (grams)	P ₂ O ₅ (grams)	CaO (grams)	P ₂ O ₅ (grams)
A & B	Each consumed ..	45.19	33.90	50.04	37.57
A	Retained by body ..	23.05	20.18	26.12	22.25
	Per cent. retention ..	51.01	59.51	52.19	59.24
B	Retained by body ..	22.83	19.49	22.87	17.78
	Per cent. retention ..	50.52	57.49	45.71	47.34

Result.—There was no increase in the retention either of calcium or phosphorus as a result of the addition to the diet of cod liver oil.

BALANCE EXPERIMENT II.—*To determine the effect on the calcium and phosphorus retention of adding cod liver oil to a diet of poor quality weathered hay, cereals, oil cake, sugar pulp, common salt and ground limestone.*

Particulars of the daily allowance of food during the two periods of the experiment and of the retention per day of calcium and phosphorus in comparison with the calcium and phosphorus consumed are given in tables IX and X.

TABLE IX.

	Control diet			Control diet plus cod liver oil		
	Total quantity consumed (grams)	Total calcium (CaO) consumed (grams)	Total phosphorus (P ₂ O ₅) consumed (grams)	Total quantity consumed (grams)	Total calcium (CaO) consumed (grams)	Total phosphorus (P ₂ O ₅) consumed (grams)
Hay—poor quality .. (weathered)	908	3.98	3.85	908	3.99	3.87
Meals :						
bran ..	255	4.92	15.61	255	4.96	15.72
flaked barley ..	255			255		
flaked maize ..	255			255		
linseed cake ..	153			153		
earth nut cake ..	102			102		
Sugar pulp ..	227			227		
Salt ..	10	—	—	10	—	—
Limestone ..	20	10.42	—	20	10.42	—
Cod liver oil ..	—	—	—	47	—	—
Total ..	2,185	19.32	19.46	2,232	19.37	19.59

TABLE X.

Animal		Control diet		Control diet plus cod liver oil	
		CaO	P ₂ O ₅	CaO	P ₂ O ₅
C & D	Each consumed ..	19.32 grams	19.46 grams	19.37 grams	19.59 grams
C	Retained by body ..	11.88 grams	8.84 grams	10.40 grams	10.23 grams
	Per cent. retained ..	61.51	45.43	53.68	52.22
D	Retained by body ..	8.84 grams	6.68 grams	8.96 grams	6.90 grams
	Per cent. retained ..	45.76	34.34	46.25	35.22

Result.—There was no increased retention of calcium or phosphorus as a result of adding cod liver oil to the diet. In the light of the results from animal D, the increase in phosphorous retention by C cannot be regarded as significant.

BALANCE EXPERIMENT III.—*To determine the effect on the calcium and phosphorus retention of adding cod liver oil to a diet of poor quality weathered hay, cereals, oil cake, sugar pulp and common salt.*

Particulars of the daily allowance of food during the two periods of the experiment and of the retention per day of calcium and phosphorus, in comparison with the calcium and phosphorus consumed, are given in tables XI and XII.

TABLE XI.

	Control diet			Control diet plus cod liver oil		
	Total quantity consumed (grams)	Total calcium (CaO) consumed (grams)	Total phosphorus (P ₂ O ₅) consumed (grams)	Total quantity consumed (grams)	Total calcium (CaO) consumed (grams)	Total phosphorus (P ₂ O ₅) consumed (grams)
Hay—poor quality (weathered) ..	1,100	7.00	6.09	1,500	9.48	8.25
Meals :						
bran ..	275	4.10	16.06	375	5.63	22.10
flake maize ..	550			750		
linseed cake ..	275			375		
Sugar pulp ..	122			167		
Salt ..	11	—	—	15	—	—
Cod liver oil ..	—	—	—	50	—	—
Total ..	2,333	11.10	22.15	3,232	15.11	30.35

TABLE XII.

Animal		Control diet		Control diet plus cod liver oil	
		CaO	P ₂ O ₅	CaO	P ₂ O ₅
E & F	Each consumed ..	11.10 grams	22.15 grams	15.11 grams	30.35 grams
E	Retained by body ..	3.49 grams	0.35 grams	8.78 grams	10.57 grams
	Per cent. retained ..	31.45	1.58	58.11	34.83
F	Retained by body ..	4.96 grams	3.56 grams	8.87 grams	11.16 grams
	Per cent. retained ..	44.70	16.07	58.69	36.77

Result.—The addition of cod liver oil in this case effected an appreciable increase in the retention of calcium and a very considerable increase in the retention of phosphorus. In the case of this experiment the principal source of calcium in the control diet was poor quality hay, while in experiment II, in which the result of adding cod liver oil was negative, the control diet included similar hay and limestone, and in experiment I, in which the result was negative also, the control diet included good quality hay and limestone.

BALANCE EXPERIMENTS IV AND V.—*To determine the effect on the calcium and phosphorus retention of adding salt (sodium chloride) to a diet of poor quality weathered hay, cereals, and oil cake (Exp. IV) and to similar hay, cereals, oil cake and sugar pulp (Exp. V).*

Particulars of the daily allowance of food during the two periods of each experiment, and of the retention per day of calcium and phosphorus in comparison with the calcium and phosphorus consumed, are given in the following tables.

Tables XIII and XIV refer to experiment IV and tables XV and XVI to experiment V.

TABLE XIII.

	Control diet			Control diet plus salt (sodium chloride)		
	Total quantity consumed (grams)	Total calcium (CaO) consumed (grams)	Total phosphorus (P_2O_5) consumed (grams)	Total quantity consumed (grams)	Total calcium (CaO) consumed (grams)	Total phosphorus (P_2O_5) consumed (grams)
Hay—poor quality .. (weathered)	1,800	13.76	8.25	2,400	18.81	11.29
Meals :						
bran ..	120	1.75	12.75	160	2.32	16.87
maize ..	900			1,200		
earth nut cake ..	180			240		
Salt ..	—	—	—	16	—	—
Total ..	3,000	15.51	21.00	4,016	21.13	28.16

TABLE XIV.

		Control diet		Control diet plus salt (sodium chloride)	
		CaO	P_2O_5	CaO	P_2O_5
A & B	Each consumed ..	15.51 grams	21.00 grams	21.13 grams	28.16 grams
A	Retained by body ..	5.66 grams	7.84 grams	11.77 grams	13.98 grams
	Per cent. retained ..	36.50	37.34	55.69	49.67
B	Retained by body ..	4.75 grams	6.09 grams	9.97 grams	11.82 grams
	Per cent. retained ..	30.63	29.00	47.18	42.01

TABLE XV.

	Control diet			Control diet plus salt (sodium chloride)		
	Total quantity consumed (grams)	Total calcium (CaO) consumed (grams)	Total phosphorus (P_2O_5) consumed (grams)	Total quantity consumed (grams)	Total calcium (CaO) consumed (grams)	Total phosphorus (P_2O_5) consumed (grams)
Hay—poor quality (weathered) ..	900	5.70	4.96	1,100	7.00	6.09
Meals :						
bran ..	225	3.36	13.21	275	4.10	16.06
flake maize ..	450			550		
linseed cake ..	225			275		
Sugar pulp ..	100			122		
Salt ..	—	—	—	11	—	—
Total ..	1,900	9.06	18.17	2,333	11.10	22.15

TABLE XVI.

Animal		Control diet		Control diet plus salt (sodium chloride)	
		CaO	P_2O_5	CaO	P_2O_5
E & F	Each consumed ..	9.06 grams	18.17 grams	11.10 grams	22.15 grams
E	Retained by body ..	Calf removed because of illness		3.49 grams	0.35 grams
	Per cent. retained ..			31.45	1.58
F	Retained by body ..	0.98 grams	-2.00 grams	4.96 grams	3.56 grams
	Per cent. retained ..	10.81	negative	44.69	16.07

Result.—The addition of sodium chloride to the ration effected an appreciable increase in the retention both of calcium and of phosphorus in both experiments.

BALANCE EXPERIMENT VI.—*To determine the effect on the calcium and phosphorus retention of adding salt (sodium chloride) and limestone to a ration of poor quality weathered hay, cereals, oil cake and sugar pulp.*

Particulars of the daily allowance of food during the two periods of the experiment and of the retention per day of calcium and phosphorus, in comparison with the calcium and phosphorus consumed, are given in tables XVII and XVIII.

TABLE XVII.

	Control diet			Control diet plus salt (sodium chloride) and limestone		
	Total quantity consumed (grams)	Total calcium (CaO) consumed (grams)	Total phosphorus (P_2O_5) consumed (grams)	Total quantity consumed (grams)	Total calcium (CaO) consumed (grams)	Total phosphorus (P_2O_5) consumed (grams)
Hay—poor quality .. (weathered)	908	3.96	3.83	908	3.98	3.85
Meals :						
bran ..	255	4.98	15.80	255	4.92	15.61
flaked barley ..	255			255		
,, maize ..	255			255		
linseed cake ..	153			153		
earth nut cake ..	102			102		
Sugar pulp ..	227			227		
Salt ..	—	—	—	10	—	—
Ground limestone ..	—	—	—	20	10.42	—
Total ..	2,155	8.94	19.63	2,185	19.32	19.46

TABLE XVIII.

Animal		Control diet		Control diet plus salt (sodium chloride) and limestone	
		CaO	P_2O_5	CaO	P_2O_5
C & D	Each consumed ..	8.94 grams	19.63 grams	19.32 grams	19.46 grams
C	Retained by body ..	3.21 grams	5.86 grams	11.88 grams	8.84 grams
	Per cent. retained ..	35.91	29.85	61.51	45.43
D	Retained by body ..	2.73 grams	3.91 grams	8.84 grams	6.68 grams
	Per cent. retained ..	30.54	19.92	45.76	34.34

Result.—There was a considerable increase in the retention of calcium and of phosphorus as a result of adding salt and limestone to the ration. That the salt was a factor in effecting the increased retention is evident from the results of experiments IV and V. In how far the increased retention was due to the limestone is discussed with the results of balance experiment VII.

BALANCE EXPERIMENT VII.—*To determine the effect on the calcium and phosphorus retention of adding limestone to a diet of good quality hay, cereals, oil cake and salt (sodium chloride).*

Particulars of the daily allowance of food during the two periods of the experiment and of the retention per day of calcium and phosphorus in comparison with the calcium and phosphorus consumed, are given in tables XIX and XX.

TABLE XIX.

	Control diet			Control diet plus limestone		
	Total quantity consumed (grams)	Total calcium (CaO) consumed (grams)	Total phosphorus (P_2O_5) consumed (grams)	Total quantity consumed (grams)	Total calcium (CaO) consumed (grams)	Total phosphorus (P_2O_5) consumed (grams)
Hay—good quality ..	2,550	21.08	13.77	2,700	22.77	14.86
Meals :						
bran ..	170	2.47	17.96	180	2.62	19.04
maize ..	1,275			1,350		
earth nut cake ..	253			270		
Salt ..	17	—	—	18	—	—
Limestone ..	—	—	—	36	19.80	—
Total ..	4,267	23.55	31.73	4,554	45.19	33.90

TABLE XX.

Animal		Control diet		Control diet plus limestone	
		CaO	P_2O_5	CaO	P_2O_5
A & B	Each consumed ..	23.55 grams	31.73 grams	45.19 grams	33.90 grams
A	Retained by body ..	14.05 grams	17.97 grams	23.05 grams	20.18 grams
	Per cent. retained ..	59.67	56.63	51.01	59.51
B	Retained by body ..	13.74 grams	16.62 grams	22.83 grams	19.49 grams
	Per cent. retained ..	58.34	52.36	50.52	57.49

Result.—The addition of the limestone effected a definite increase in the retention of phosphorus. Not alone was there an increase in the total phosphorus retained, which of course was partly due to an increase in the phosphorus ingested owing to the larger ration fed during the second half of the experiment, but there was an increase in both animals in the percentage of phosphorus retained. In the case of calcium there was a decrease in the percentage retained in the second half of the experiment. This was

obviously due to the very large supplement of lime added to the control ration. Nevertheless, as between the actual total retention of calcium during the period of control feeding and that of the control plus limestone supplement there is a very considerable difference in favour of the latter period, so that there was an increased retention of calcium in this experiment as a result of adding limestone to the control ration.

Comparison of balance experiments II and III, in which the results of adding cod liver oil were negative and positive respectively, shows that the calves utilised the inorganic calcium which was supplied during the period of balance experiment II. Again in balance experiment VII there was a positive result from the addition of limestone to the diet. Hence in experiment VI, where a positive result on the calcium and phosphorus retention was obtained as a result of supplementing the diet with salt and limestone, the positive effect must be partly credited to the limestone added.

DISCUSSION.

Balance experiments IV and V indicate that, from a diet composed of cereals, oil cake, roots and poor quality weathered hay, the retention both of calcium and of phosphorus is comparatively very low, and that part at least of the explanation lies in the deficiency of the foods in sodium chloride, the addition of which markedly increases the proportion of calcium and also of phosphorus which is retained from the food by the body. This is in accord with the findings of Common (47) who showed that in the fowl the calcium and phosphorus retention is related to the amount of sodium chloride in the food. The hay used in the case of balance experiments IV and V contained less than half of one per cent. of chlorine, which is not 50 per cent. of the chlorine content of good hay. It is difficult in group tests, as shown by group experiments I and II, to demonstrate any benefit from the addition of sodium chloride to a ration which includes abundance of good quality hay. On the other hand in similar tests, as shown by group experiments III and IV, the beneficial effects of sodium chloride as a supplement to a diet of cereals, oil cake, roots and poor-quality weathered hay became evident, if not in the weight increment, at any rate in the appearance of the cattle. The necessity for adding sodium chloride to a diet of cereals or their by-products, oil cakes, and roots is already recognised (1) and, therefore, a calf on a diet of these foods together with hay depends for a sufficiency of this food ingredient on the quality and quantity of hay consumed. Even when the quality is low if a very large quantity of hay is consumed daily by a calf, as in the case of group experiment V, there is no advantage in the weight increment from the feeding of sodium chloride. It must be borne in mind, however, that the limitation of the meal feeding which was necessary in order to effect a large consumption of hay, hindered the progress of all groups in group experiment V, so that a possible advantage from the feeding of salt may not have had an opportunity of becoming pronounced. In view of the possibility of a low content of sodium chloride in a sample of hay, or of a low consumption of hay even of high salt content,

it is a wise precaution under all circumstances to add salt (1 per cent.) to the meal ration of calves fed on hay and a meal mixture of cereals, oil cake, and roots.

That calves are able to assimilate and retain an inorganic calcium supplement is clearly shown by the balance experiments, particularly by experiment VII of the balance group. In that particular case a considerable proportion of the added calcium carbonate was retained by calves the basic diet of which consisted of good quality hay, bran, maize, earth nut cake and salt, a food mixture whose calcium (CaO) to phosphorus (P_2O_5) ratio was approximately as $\frac{3}{4}$ to 1. The evidence from balance experiment VI, taken in conjunction with that from a comparison of balance experiments II and III, is also in favour of a beneficial effect on calcium retention following the addition of inorganic calcium to the diet. Group experiments I and II failed to show any obvious advantage from the addition of calcium to a diet of cereals, oil cake, roots and good quality hay. When, however, the hay fed was of poor weathered quality, as in group experiments IV and V, the addition of lime to the diet, while not producing any difference in the weight increment, made itself evident in the appetite of the calves and in the appearance of the hair. The calcium supplement groups showed a decidedly brisker appetite than the control groups, an observation similar to that made by Eckles, Gullickson and Palmer (48), when phosphorus was added to the diet of young cattle suffering from a deficiency of that ingredient in the diet, and also in accord with that of Frazer (49) who states that the arrest of growth in sheep on a calcium-deficient diet is partly due to decreased food consumption. Apparently the addition of calcium to the diet which contained the inferior hay enabled the calves to moult more readily, and thus, for a particular period at any rate, produced a coat which showed more "bloom" than that of companion animals on the control diet. Possibly a more specific difference between the control and the lime supplement groups existed in the density and ash content of the skeleton. Evidence to the effect that even in the absence of apparent external difference a pronounced improvement in skeletal composition follows the feeding of supplementary calcium has already been referred to (36). The normal composition of the bone is sacrificed to growth. Indeed the effect of a dietary deficiency is revealed in the body weight much earlier than it is in skeletal growth (50). But the body weight increment is by no means an indication of the completeness or deficiency of a diet. At Pennsylvania (9) an animal fed the basic rachitogenic diet, which produced definite symptoms of rickets in comrade calves, thrive and grew apparently normally for over a year. Yet when slaughtered, the bones revealed an abnormally low ash content. A calf fed by Eckles (51) on a low mineral ration made equal gains in weight and in size to one which was fed on a ration containing three times as much calcium and phosphorus, but the animal on the low mineral diet completely broke down in condition at eighteen months of age.

On a diet consisting of cereals, oil cakes, roots, and hay, the hay is the principal source of calcium, and it is clear that the retention of a sufficiency

of calcium to provide for normal growth depends on the quantity and quality of the hay consumed. Anderson, McCampbell and Marston (19) showed that the weight increase of calves on poor quality hay was less than that on good hay, and that the former was made equal to the latter by the addition of ground limestone. When, in the experiments reported in this paper, the feeding was so arranged that the calf was consuming four pounds of good quality hay at the age of five months, there was no indication whatsoever from the group tests of a beneficial effect from the addition of lime. Four pounds daily of poor quality hay at five months of age was, however, apparently insufficient. In view of the necessity, from the mineral point of view, of the ingestion of a considerable quantity of hay by the calf it is important that hay be palatable, and of course, that it should include all the minerals originally present in the herbage from which it is made. If the rate of consumption even of good quality hay is less than what would correspond with four pounds daily when the calf is five months old, the evidence points to the advantage of supplementing the diet with lime in some suitable form. This is, of course, on the assumption that no calcium-rich food other than hay is fed. When, however, milk forms part of the diet in addition to hay and meals, the necessity for adding lime disappears. Group experiment VI showed that half a gallon of separated milk daily to a calf so fed fully supplements, after the seventh week of age, the remainder of the diet. Alternatively, the inclusion of meat meal or of fish meal in the meal ration to the extent of fifteen per cent. obviates the necessity for the addition of inorganic calcium to the diet. Pasture is superior to hay as a source of calcium, but the consumption of green herbage by the calf is comparatively small till he reaches the age of four or five months, so that from the point of view of a full mineral supply the inclusion of separated milk or meat or fish meal, or of an inorganic source of calcium in the diet at least up to the age of about five months, is important. Milk is the most valuable source of minerals, not alone because of its high digestibility, but also because of a possible beneficial effect of the lactose of the milk on the retention of minerals from the other constituents of the diet (52).

The balancing of the diet of a calf so as to raise the level of the calcium (CaO) therein to that of the phosphorus (P_2O_5) not alone supplies a possible deficiency of calcium but, by correcting an incorrect calcium to phosphorus ratio, also increases the retention of phosphorus. The results of balance experiment VI definitely show that when, by the feeding of ground limestone, the calcium to phosphorus ratio is raised from a level of 0.45 to 1 to a level of 1 to 1, the retention both of calcium and phosphorus consumed is raised by approximately 60 per cent. By similarly raising the ratio from 0.7 to 1 to a level of 1.3 to 1 in balance experiment VII the percentage retention of phosphorus was raised also, though in view of the better balance of the control diet in this case, the improvement was less obviously marked.

Apparently the foods used in group experiment I contained sufficient iron and also sufficient iodine for the requirements of the calf, there being

no evidence whatsoever of a beneficial effect from the addition of these elements to the diet.

While the group experiments revealed nothing which would credit cod liver oil, as fed in these experiments, with a beneficial effect, the balance experiments indicated, in the first place, that cod liver oil raised the digestibility of the dry matter of the entire ration, especially when the hay fed was of inferior quality. The following figures are the digestibility co-efficients of the dry matter in the case of each of the three experiments in which cod liver oil was fed.

<i>Balance Exp. I.</i>	.. Calf A—Control diet	69.6
(good hay in control diet)	.. .. + cod liver oil	72.8
	Calf B—Control diet	70.3
	.. .. + cod liver oil	72.5

<i>Balance Exp. II.</i>	.. Calf C—Control diet	68.8
(inferior hay in control diet)	.. .. + cod liver oil	67.8
	Calf D—Control diet	60.0
	.. .. + cod liver oil	67.0

<i>Balance Exp. III.</i>	.. Calf E—Control diet	59.7
(inferior hay in control diet)	.. .. + cod liver oil	65.3
	Calf F—Control diet	59.8
	.. .. + cod liver oil	66.2

While the number of experiments was not sufficiently large to enable a very definite statement to be made in connection with this particular effect of cod liver oil, and while in balance experiment I the difference in digestibility between the control and the experimental diet is not significant, yet in the case of balance experiments II and III the effect of the addition of the oil is fairly pronounced and consistent. The second effect of cod liver oil as revealed by balance experiments I, II and III is very interesting. Experiment I, in which the oil was added to a diet of good hay, salt, ground limestone and meals, showed no increased retention of calcium or phosphorus as a result of the addition. The effect was also negative in experiment II in which the diet included low-quality hay, salt, ground limestone and meals, but in experiment III, where the diet was similar to II except that the limestone was omitted, the effect was definitely positive. Obviously, when there is an abundance of calcium and a supply of vitamin D which is possibly at, or slightly below the optimum, the addition of cod liver oil to the diet serves no useful purpose. But when the supply of vitamin D is possibly below the optimum and, as in experiment III, calcium is deficient, cod liver oil enhances the value of the ration by increasing the retention by the calf both of calcium and phosphorus. The positive effect of cod liver oil in experiment III showed that there was an insufficiency of vitamin D in the control diet. In this connection again, unless calves enjoy abundance of direct light, if the remainder of the diet is made up of cereals, oil cakes, and roots, the hay or other long fodder is the principal source of vitamin D.

According to Rupel and his co-workers (8) sun-cured hay fed liberally

supplies ample vitamin D to the calf. As a source of vitamin D the quality of the fodder is also of importance. Straw and poor quality hay are less valuable in this respect for calves than is hay of good quality (53). As in the case of the mineral supply, the effect of hay in providing vitamin D depends on the quantity consumed. In this connection a very interesting case is reported by Rupel and his co-workers (8). Calves fed on a commercial farm on milk together with a very liberal ration of meals (maize, bran and linseed meal) and some hay of relatively low quality, and allowed out for exercise in early morning only, developed symptoms which were identified as akin to those of a rachitic condition, that is stiffness of gait and a low percentage of calcium and phosphorus in the blood. The addition of cod liver oil to the diet caused a disappearance of the rachitic condition and restored the calves to normal health. In this particular case the long fodder was the principal source of vitamin D, but, owing to the very high consumption of meals, an insufficient quantity of hay to provide the requisite quantity of vitamin D was consumed. It is felt that, in many cases, the feeding of large quantities of meals, and the necessarily low consumption of hay by calves, acts in this way as a limiting factor to healthy development; and much of the disappointment in the preparation of young stock for shows and sales may be thus explained. Rupel (8) states that three to four pounds of sun-cured hay daily to a calf of three to five months old affords adequate protection against an insufficiency of vitamin D. This quantity of hay more or less corresponds with that which, in the experiments which form the subject of this report, was sufficient to supply the necessary minerals. If the fodder is limited or the calves are housed in compartments which are not directly lighted, cod liver oil or some other antirachitic agent should be added to the calf's diet. The feeding of meals in such considerable quantity that the consumption of other foods is reduced to very small degree creates an unbalanced condition both in respect of minerals and of vitamin D. Hence the significance of the recommendation of Orr (54) that, when calves are weaned early on to a ration consisting chiefly of cereal products, more rapid growth and better condition are obtained in indoor feeding in winter by balancing up the ration by the addition thereto of mineral salts and cod liver oil.

SUMMARY.

1. The results of group and balance experiments dealing with mineral metabolism in calves past the age of seven weeks are reported.
2. A deficiency of sodium chloride in the diet is reflected in unthriftiness, a want of "bloom" in the coat, and a low retention of calcium and phosphorus: the addition of common salt to the ration improves the appearance, increases the weight increment, and markedly raises the percentage retained in the body of the calcium and phosphorus ingested; when the fodder is of low quality and the remainder of the diet consists of cereals or their by-products, roots and oil cakes, it is beneficial to raise the sodium chloride content of the ration by feeding common salt at the rate of 1 per cent. of the meals consumed.

3. Calves have the power of assimilating and retaining calcium from inorganic salts.
4. When the calcium (CaO) to phosphorus (P_2O_5) ratio of the diet of a calf is less than unity the addition of calcium to the ration not alone supplies a calcium deficiency, but also, by correcting the balance, raises the retention of phosphorus.
5. A deficiency of calcium in the diet of calves produces among other results a sluggish appetite, and appears to hinder the progress of the moult, *i.e.* the shedding of the old coat and its replacement by new hair.
6. In a diet of fodder, cereals and cereal by-products, roots and oil cakes, the fodder is the principal source of calcium, the intake of a sufficient supply of which depends on the quantity and quality of the fodder consumed; when good quality hay forms the fodder, and the feeding of it is so regulated that at the age of 5 months the calf is consuming 4 pounds per day, group experiments fail to demonstrate any useful effect from adding lime to the diet, though balance experiments reveal an increased retention of calcium; when, however, the hay is of poor quality, protection from an insufficiency of calcium in the diet is not afforded by the above quantity. Calves which are given a diet of fodder, cereals, roots and oil cake, and fed very liberally on meals, suffer from an insufficiency of calcium because of the necessarily low proportion of fodder consumed, and it is suggested that this is not a rare occurrence.
7. When no other calcium-rich food is fed, and the rate of consumption even of good quality hay is less than what would correspond with 4 pounds at 5 months of age, it is an advantage to supplement the diet with lime, either sterilised bone flour or ground limestone; the inclusion in the daily ration of half a gallon of milk per calf, or the incorporation into the meal mixture of 15 per cent. of meat or fish meal obviates the necessity for a calcium supplement.
8. The addition of supplementary iron or iodine to the diet of calves reared in the ordinary way in these countries does not enhance the value of the diet.
9. When the diet of calves includes a large proportion of cereals and their by-products there is no danger of a shortage of phosphorus.
10. The addition of cod liver oil to a diet which includes poor quality weathered hay raises the digestibility of the dry matter of the entire ration.
11. The feeding of cod liver oil, as a source of vitamin D to calves fed on a low calcium diet, including weathered hay, and housed under the conditions reported in these experiments, has the effect of raising the retention of calcium and phosphorus; this effect of cod liver oil does not appear except when vitamin D from other sources is available in less than optimum quantity; calves fed a satisfactory ration, and treated in the manner customary on the ordinary farm, do not benefit from cod liver oil; yet animals which receive a very liberal ration

of meals, and eat little hay and are housed in dark compartments may suffer from a shortage of vitamin D, and show symptoms of rickets which are cured by cod liver oil.

12. Fodder, being rich in vitamin D, forms from this point of view also, an important part of the diet of the calf, the quantity and quality consumed determining the supply of vitamin D from this source.

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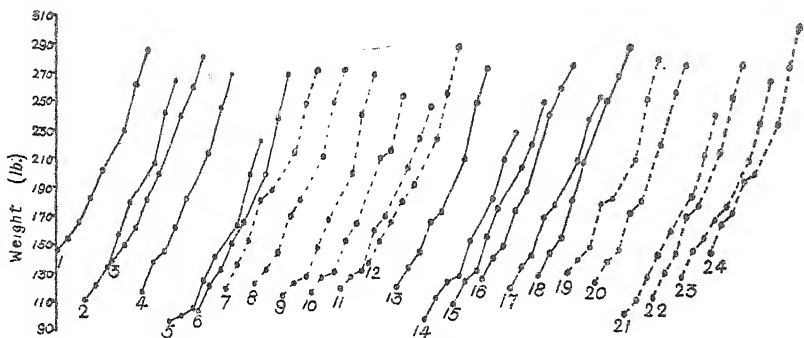


Fig. I. GROUP EXP. I.

Group I. Calves No. 1 to 6.
 " II. " " 7 to 12.
 " III. " " 13 to 18.
 " IV. " " 19 to 24.

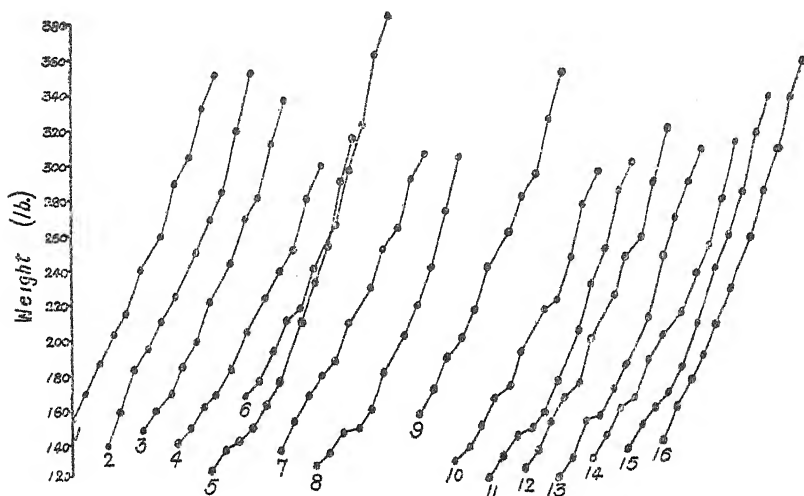


Fig. II. GROUP EXP. II.

Group I. Calves No. 1 to 8.
 " II. " " 9 to 16.

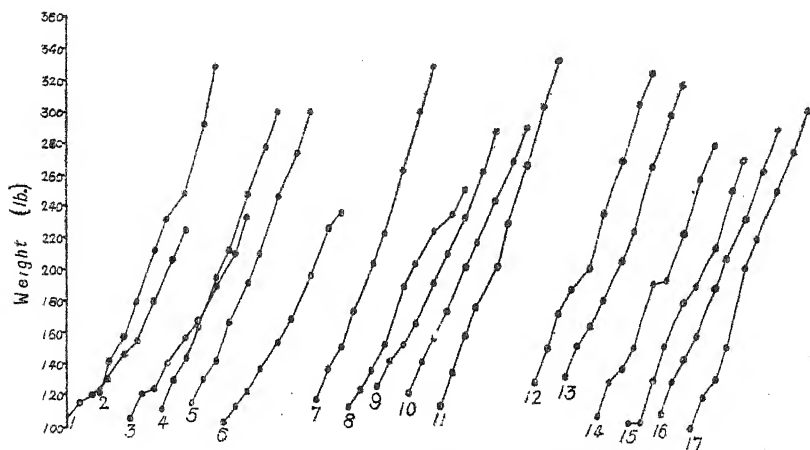


Fig. III. GROUP EXP. III.

Group I. Calves No. 1 to 6.
 " II. " " 7 to 11.
 " III. " " 12 to 17.

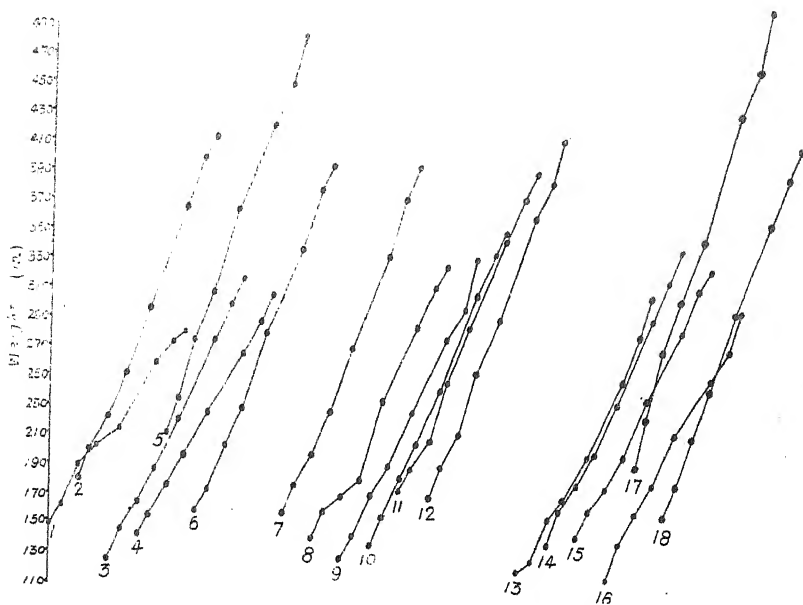


Fig. IV. GROUP EXP. IV.

Group I. Calves No. 1 to 6.
 " II. " " 7 to 12.
 " III. " " 13 to 18.

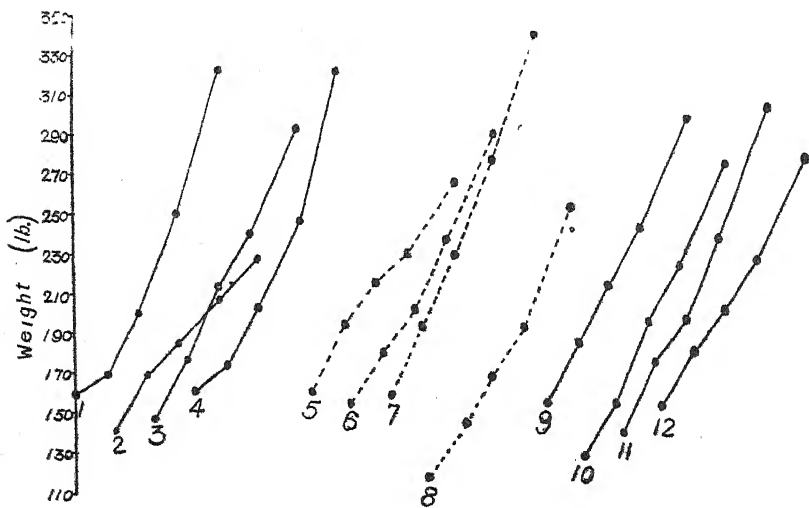


Fig. V. GROUP EXP. V.

Group I. Calves No. 1 to 4.
 " II. " " 5 to 8.
 " III. " " 9 to 12.

REPORT OF THE SEED PROPAGATION DIVISION, 1934.

GENERAL.

Rainfall records at Ballinacurra for the year 1934 showed long, dry spells. In February the rainfall amounted to only 0.3 inches, as compared with the normal average of 3 inches, and the ground was so dry and hard that it could be cultivated only with difficulty. March provided 4.6 inches of rain, with suitable conditions for the sowing of crops. April was cold in the early part of the month, and harsh winds retarded growth, but the weather was good for farm work. Similarly, cold winds discouraged growth in the early part of May, and a violent gale on the 7th did much damage to trees and shrubs. Drought became a cause for anxiety by the end of May. This was greatly intensified in June and July, a period of warm and sunny weather. These conditions encouraged early ripening of grain crops and in many districts harvesting began early in August. Conditions for saving corn were most favourable until the 20th of that month when a violent gale did much damage, and inaugurated a period of broken weather, which continued throughout September. The rainfall for the latter month broke all previous September records at Ballinacurra, and amounted to 6.8 inches. Rainfall and sunshine during October and November were both considerably below the average.

In most districts cereal crops gave good yields and were well saved, particularly in the earlier areas. Quality of the produce was not of a high order, and straw was short, owing, no doubt, to the dry conditions prevailing during the major portion of the growing period. Owing to the broken weather, threshing was somewhat delayed. Many samples of grain were not of a good colour and the moisture content generally ranged from 18 to 20 per cent.

As in previous years, the bulk of the barley propagations and other investigational work were carried out at the Cereal Station, Ballinacurra, under the supervision of Mr. J. H. Bennett, and in collaboration with Messrs. A. Guinness, Son & Co. Ltd., at whose Experimental Maltings and Laboratories all the malting tests and analyses were made.

The barley propagations consisted of pure line cultivations, garden plots, field plots, first pedigree and second pedigree plots of numerous varieties. The experiments consisted of chessboard and half-drill strip tests with different varieties and a trial designed to test the efficiency of the Hornsby-Leake Precision Corn Drill. Some small plots of new varieties of barley were grown for observation purposes and several new hybrids were produced.

Some plots of wheat and barley were sown with Vernalised seed for observation purposes:

Extension plots of oats, comprising the varieties Victory II and Glasnevin Success respectively, were grown with ten farmers in the neighbourhood of Ballinacurra. The produce of these plots was distributed to seed merchants and others in the early spring of 1935.

Five different varieties of sugar beet were also cultivated at the Cereal Station with the object of determining the possibilities of producing suitable sugar beet seed in the Saorstát. In addition, seed from selected sugar beet plants and from hybrids was sown in a number of plots.

BARLEY.

Investigations designed to find means of combating diseases of barley, especially Smut (*Ustilago H.*) and Stripe disease, also known as Net Blotch (*Helminthosporium*) have been conducted at the Cereal Station, Ballinacurra, over a number of years and the results have been published year by year. As a result of these investigations, all seed sown at the Cereal Station and all seed despatched from it is now treated with Agrosan powder. This treatment again proved effective against Smut in 1934, for no smutted plant was found in any of the crops grown from the treated seed.

PROPAGATIONS.

For the past five years the method of obtaining the seed for sowing the Single Line of Spratt-Archer 37 No. 3 has been to take ten grains from every fifth plant, of which five grains were sown and five grains kept in reserve. The Single Line this year was, therefore, composed of twenty-five lines each sown with five grains. At harvest time ten grains were taken from one plant in each of the five-grain lines in order to provide seed for the Pure line sown in 1935. The garden plot of this variety also consisted of twenty-five lines, each one sown with the produce of a five-grain line in 1933. As well as this garden plot, there was a further series of twenty-five garden plots each sown with the produce of a single ear taken from the same plant as the ten grains. The produce of these latter plots has been reserved for malting analysis, in order to ascertain whether the malting quality has been maintained in all the twenty-five lines which composed the garden plot and which will eventually, if the results of the analyses are uniform, go to form the field plot. If the produce of any plot is found deficient in malting quality, its counterpart in all the propagations will be removed.

In 1934, for the first time, the pure line of Spratt-Archer 37 No. 4 was also selected by this method. This variety has been yielding slightly better than Spratt-Archer 37 No. 3, although its malting quality has not been quite so good as that of the latter.

In this connection also, a trial has been carried out for some years with the produce of the grains from an individual ear of Spratt-Archer 37 No. 3, during which it was found that two of the grains produced plants which differed

from those produced by the other grains. At first the difference was only noticed in the produce of one grain, but in later years it was observed in the produce of two grains. The difference was first noticed in the foliage of the plants, and later in the analyses of the grain.

The trial was again made in 1934, the plots being sown in a modified chessboard pattern. The same differences in habit of growth were again easily noticeable in the plots sown with seed, the produce of the two plants in which a difference was noticed in previous years, and the differences in the analyses were also maintained.

The results of these tests are important because they indicate that, in selecting a single plant for the propagation of a pure line, especially when dealing with hybrids, selection on appearance alone will not always enable one to choose a plant carrying all the desirable factors of the parent plant, or even a plant of average merit for that particular variety. Selection for many factors can only be done as a result of comparative analyses. It would seem, therefore, that to obtain a nucleus for carrying on any particular variety or strain, it is desirable to choose a number of typical plants, to bulk the produce of these together, and to draw therefrom at random the quantity of seed required for propagation.

In addition to Spratt-Archer 37 No. 3 and Spratt-Archer 37 No. 4, there were seventy-seven single plant selections grown in the Old Cage, and a number of selections of the F₂ generation of a new hybrid of Spratt-Archer x Archer-Goldthorpe. Of these a number was grown for observation purposes only. Thirty-seven of these varieties were also grown in garden plots in the Rosehill Middle Field. In this series also, there were 25 plots of Spratt-Archer 37 No. 3, each grown from the produce of a single ear from the five-grain lines. The produce of these plots went for bag malting trials. The variety known as Student I, which is a new hybrid, was grown in 15 plots, each being sown with the produce of a single plant. The plots were kept separate in order to see if there were any signs of "splitting", but as this did not occur the selections are apparently identical. Student II was also grown in 14 plots, with the same object. These showed some variation: one plot, No. 13, was splitting up to such an extent that it was discarded. The remainder will again be grown in larger plots in 1935.

Fourteen varieties were grown in field plots in order to secure sufficient seed for further trials and propagations. Ten of these were brought a stage further and grown in 1st pedigree plots, the produce of which will be available for Large Scale Variety Experiments and for distribution as pedigree seed. One variety only, Spratt-Archer 37 No. 3, was grown in 2nd pedigree plots, and these were located on the farms of five growers in the immediate neighbourhood of Ballinacurra. The total area was approximately 40 statute acres, and from this acreage about 400 barrels of seed were obtained for distribution in 1935 to members of the Irish Maltsters' Association and others interested in the propagation of seed barley.

DISTRIBUTION OF PEDIGREE SEED.

Under the Department's scheme for the distribution of Pedigree Seed Barley, 196 barrels of pure line Spratt-Archer 87 No. 3 were distributed as follows :—

	Brls.	Sts.
Messrs. P. O'Meara & Sons, Thurles, Co. Tipperary ..	10	0
Messrs. Beamish & Crawford, Brewers, Cork ..	5	0
Messrs. R. Perry & Sons, Rathdowney, Laoighis ..	5	0
Messrs. Cairnes, Drogheda, Co. Louth ..	10	0
Messrs. E. Smithwick & Sons, Kilkenny ..	5	0
The Birr Maltings, Ltd., Birr, Offaly ..	12	0
Messrs. F. A. Waller & Co., Banagher, Offaly ..	10	0
Messrs. Joshua Watson & Co., Ltd., Carlow ..	16	0
Messrs. George Read & Co., Roscrea, Co. Tipperary ..	8	0
Messrs. W. J. O'Keefe & Sons, Wexford ..	4	0
Messrs. P & H. Egan, Ltd., Tullamore, Offaly ..	8	0
Messrs. D. E. Williams, Ltd., Tullamore, Offaly ..	8	0
Messrs. J. & A. Tarleton, Ltd., Tullamore, Offaly ..	8	0
Messrs. Robert Gibney & Co., Ltd., Portlaoighise, Laoighis ..	7	0
Mr. A. J. M. Reeves, Athgarvan, Newbridge, Co. Kildare ..	4	0
Messrs. Minch, Norton & Co., Ltd., Athy, Co. Kildare ..	39	0
Messrs. Minch, Norton & Co., Ltd., Nenagh, Co. Tipperary ..	10	0
Messrs. Minch, Norton & Co., Ltd., Bagenalstown, Co. Carlow ..	8	0
Messrs. Minch, Norton & Co., Ltd., Barragheore, Goresbridge, Co. Kilkenny ..	8	0
Messrs. John Bolger & Sons, Ferns, Co. Wexford ..	10	0
Mr. J. P. Kearney, Riverstown, Dundalk, Co. Louth ..	1	4
Total ..	196	4

NOTE.—All seed distributed under this scheme was treated before despatch from Ballinacurra with Agrosan G. powder as a smut preventive.

In addition to the above, the following quantities of seed of other varieties of Barley were distributed :—

	Brls.	Sts.
<i>Victory.</i>		
The Agricultural School, Athenry ..	7	6
<i>D.S.K. Binder.</i>		
Messrs. P. Breen & Sons, Castlebridge, Wexford ..	6	8
<i>July 6 rowed.</i>		
The Agricultural School, Athenry ..	3	8

Brls. Sts.

Donegal 2 rowed No. 1.

The Assistant Agricultural Overseer, Carndonagh, Co.

Donegal	1	7
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Donegal 6 rowed.

The Assistant Agricultural Overseer, Carndonagh, Co.

Donegal	—	14
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INSPECTION OF GROWING CROPS.

In accordance with the scheme for distribution of pedigree seed, the Department arranged, as in previous years, for inspection of the growing crops. Those firms who had obtained pedigree seed in recent years furnished lists of growers under three headings, namely :—(1) Growers who obtained seed direct from Ballinacurra ; (2) Growers who got seed which was the produce of seed supplied from Ballinacurra in 1933 ; and (3) Growers of Commercial Spratt-Archer Seed, the produce of which was likely to be required for seed purposes.

A total of 4,953 acres was inspected, and of this 4,480 acres were reported upon as likely to produce grain suitable for seed purposes. All the crops under heading (1), totalling 276 acres, were passed as suitable ; of the 3,403 acres under heading (2), 268 acres, or 7.9 per cent., were rejected ; and of the 1,274 acres under heading (3), 205 acres, or 16 per cent., were rejected.

The main causes for rejection were presence of Smut, undue admixture with another variety, more than one variety being grown in the same field, undue proportion of noxious weeds or inferior quality. Although these inspections have been conducted annually since 1923, this is the first year in which all crops grouped under headings (1) and (2) have been reported upon as free of Smut. This, no doubt, is mainly due to the fact that all pedigree seed sent out from Ballinacurra is treated before despatch with a fungicidal powder and that several of the firms who co-operate in the working of this scheme arrange to have their seed similarly treated before sending it out to farmers.

LARGE SCALE VARIETY EXPERIMENTS.

For a number of years the two varieties Spratt-Archer 37 No. 3 and Spratt-Archer 37 No. 4 have been included in these experiments as the standard varieties. The reason for the inclusion each year of these two varieties is that Spratt-Archer 37 No. 3 is considered the best all round variety while Spratt-Archer 37 No. 4 is considered the next best. For

the past two years the latter has yielded slightly better than Spratt-Archer 37 No. 3, but its malting quality has been consistently slightly lower.

The other two varieties included this year were both hybrids produced by the Seed Propagation Division. They were Hybrid No. 1 C and Abed Rex x Spratt-Archer 6/3/3. The experiments were conducted at ten centres, one in each of the Counties Cork, Kilkenny, Louth, Tipperary and Kildare, two in Offaly and three in Wexford. The plots at all centres were three-quarters of a statute acre each. The seed for all plots was drawn from the produce of the first pedigree plots at Ballinacurra in 1933; and the allowance of seed was at the rate of 10 stones per statute acre. The seed was dressed with Agrosan powder at the rate of 8 ozs. per barrel of seed. The produce was malted and brewed at the Experimental Maltings of Messrs. A. Guinness, Son & Co., Ltd.

The names and addresses of the growers, the nature of the soil and sub-soil, the crops grown on the land during the previous two years and the dates of sowing and harvesting in each case are set out in Table I.

In Table II are shown the weights of screened grain and screenings per statute acre, the valuation as determined by several independent barley buyers and the total value per statute acre. The screenings were valued throughout at sixpence per stone. It will be seen that Spratt-Archer 37 No. 4 yielded slightly better than Spratt-Archer 37 No. 3, the difference being three stones per statute acre. The difference in total value of grain is only two shillings and three pence in favour of Spratt-Archer 37 No. 4.

Hybrid No. 1 C gave the highest yield, the average being twelve barrels and one stone of dressed grain, while its monetary value was only fivepence less than that of Spratt-Archer 37 No. 4. Abed Rex x Spratt-Archer was lowest both in yield and value.

In the earlier stages of growth, the Abed Rex hybrid had a much darker and richer looking foliage than any of the others. Hybrid No. 1 C shot into ear first and at about that time looked the best plot of the series. As the varieties matured, however, both the Abed Rex x Spratt Archer and Hybrid No. 1 C became more uneven looking, and in the end they did not fully ripen until later than the Spratt-Archer plots.

From an examination of the particulars given in Table III, it will be seen that, judging the malting value of the sample by the nitrogen content of the dry matter, Spratt-Archer 37 No. 4 was slightly inferior to Spratt-Archer 37 No. 3, and that the two hybrids were, to a greater degree, inferior in this respect.

As a result of the malting and brewing trials, it was found that the amount of free nitrogen was lowest in the wort produced from Spratt-Archer 37 No. 3 and highest in that produced from Hybrid No. 1 C.

HALF DRILL STRIP EXPERIMENTS.

Two experiments were carried out on the land of Messrs. J. H. Bennett, Ltd. The first experiment was conducted with Spratt-Archer 37 No. 3 and the Hybrid No. 4 B.1, and the second experiment with two generations of Spratt-Archer 37 No. 3. In each experiment there were twenty-two half-drill strips of each variety, and the figures given in Table IV are the averages of the returns from these twenty-two strips. From this Table it will be seen that in Hybrid No. 4 B.1 the weight of 1,000 corns was significantly greater than in Spratt-Archer 37 No. 3, which shows that the grain was somewhat larger. The nitrogen content of Spratt-Archer 37 No. 3 was lower than that of the Hybrid, though insignificantly so, while the yield of the Hybrid was significantly superior to that of Spratt-Archer 37 No. 3.

Hybrid No. 4 B.1 has been observed for some years to be very promising, and from appearance this season at Ballinacurra it might be described as outstanding. Possibly the dry season may have suited it.

The second experiment was the usual one conducted with two generations of the standard variety Spratt-Archer 37 No. 3, and its purpose is to guard against any deterioration taking place in this variety. The results are also set out in Table IV, from which it will be seen that the returns from each generation correspond very closely, such slight differences as exist being well within the margin of experimental error. This result was to be expected, and it is a good illustration of the value and accuracy of this Half Drill Strip method for determining the relative values of varieties.

TABLE IV.

	No. 1 EXPERIMENT		No. 2 EXPERIMENT	
	Spratt-Archer 37 No. 3	Hybrid No. 4 B.1	Spratt-Archer 37 No. 3 Field Plot	Spratt-Archer 37 No. 3 Second Pedigree
Moisture per cent. ..	17.5	17.4	17.0	16.7
Weight of 1,000 corns	35.6	37.8	33.1	33.9
Nitrogen per cent. ..	1.81	1.88	1.79	1.82
Yield in lb. ..	41.7	48.1	37.4	37.4

SMALL SCALE QUANTITATIVE EXPERIMENT.

This experiment was conducted in order to test seven new varieties or selections against the standard variety Spratt-Archer 37 No. 3. It was

located in the Old Cage and was set out in the usual way in three randomised blocks. There were fifteen replications of each variety and the figures given in Table V are the mean of these fifteen.

Golden Archer No. 2 gave a yield significantly better than the mean and the standard variety. Its nitrogen content was, however, a good deal higher than that of the latter. Golden Archer No. 1 yielded higher than the standard variety but not significantly so, while its nitrogen content was slightly lower than that of Golden Archer No. 2, but higher than the standard.

The next highest yielder was Spratt-Archer 37 No. 4 x July 6 rowed 16/2 ; it was but very slightly better than the standard in yield, but considerably higher in nitrogen content. The only other point of note is that the standard variety while having the lowest nitrogen content also had the smallest 1,000 corn weight.

TABLE V.
Summary—Mean of 15 Replications.

	Variety	Mean Yield in Grammes	Weight of 1,000 corns	Nitrogen per cent.
1	Golden Archer No. 2	119	38.2	1.48
2	Golden Archer No. 1	115	36.3	1.42
3	Spratt-Archer 37 No. 4 x July 6 rowed 16/2	112	37.2	1.55
4	Spratt-Archer 37 No. 3	110	34.0	1.36
5	Spratt-Archer 37 No. 3 x July 6 rowed 6/1	106	42.8	1.67
6	Spratt-Archer 37/18 x G-S 18/1 4/2/1 ..	106	36.0	1.53
7	Spratt-Archer 37 No. 4 x July 6 rowed 16/1	101	37.5	1.66
8	Spratt-Archer 37 No. 3 x July 6 rowed 12 ..	83	35.4	1.77

AN EXPERIMENT TO COMPARE THE HORNSBY-LEAKE PRECISION CORN DRILL WITH THE FORCE FEED DRILL.

This experiment was designed to compare the Hornsby-Leake Drill when sowing at two different rates of seeding with the Force Feed Drill sowing at the higher rate. The experiment was laid out on somewhat similar lines to a Half Drill strip experiment, *i.e.*, it consisted of a number of strips, each 90 yards long, sown at the different rates of seeding and by each machine, so arranged that they were alternating with each other. The greatest difficulty in this experiment lay in the setting of the machines to sow at the desired rates. This needed a great deal of preliminary experimental

work and in the course of this work a mistake was unfortunately made in the calculations which was not discovered until after the sowing was completed. On this account the sowing by the Force Feed Drill was done at too heavy a rate and consequently from a comparative point of view the experiment was useless.

In Table VI are set out the results of the experiment as actually conducted. It will be noticed that the average yield increased in direct proportion to an increase in the rate of seeding and also that the Standard Deviation of the number of plants produced per six foot length was less for the Hornsby-Leake Drill than for the Force Feed Drill. This would point to a greater evenness of sowing in the case of the former machine.

TABLE VI.

		Seeding Rate	Plants per 6 ft. length		Average Yield per strip	
		Stones per acre	No.	Standard Deviation		
Force Feed	..	12.25	109.9	16.1	sts. 4	lb. 3
Hornsby-Leake	..	9.7	90.0	9.4	4	2
Do.	..	7.2	80.6	11.4	4	0

OATS.

Department's Extension Plots.

In order to provide a supply of seed for seed merchants and others interested in the distribution of seed oats, plots of pedigree Victory II and Glasnevin Success III were grown with selected farmers in the neighbourhood of Ballinacurra as follows :—

VICTORY II.		<i>Acres</i>	<i>Brls.</i>	<i>Sts.</i>
Mrs. Tait, Hermitage, Rostellan, Co. Cork	.. ..	4½.	4	7
Thomas Twomey, Ballintubber, Carrigtwohill, Co. Cork	.. ..	8 .	9	0
John Reilly, Ballinabointra, Carrigtwohill, Co. Cork	.. ..	5 .	5	7
Richard Barry, Leasington, Lisgoold, Midleton, Co. Cork	.. ..	5½.	6	0
William Tait, Buckstown, Rostellan, Co. Cork	.. ..	5 .	5	7
Cornelius Fitzgerald, Heamont, Carrigtwohill, Co. Cork	.. ..	4 .	4	7
Mrs. Tait, Hermitage, Rostellan, Co. Cork	.. ..	11 .	12	0
Total		..	43.	47 0

GLASNEVIN SUCCESS III.

	<i>Acres</i>	<i>Brls.</i>	<i>Sts.</i>
*William Leahy, Carrigower, Ballinacurra, Co. Cork ..	9.	10	0
*Michael Kelleher, Geragh, Ballinacurra, Co. Cork ..	4.	4	7
*John Jeffrey, Ahanesk, Middleton, Co. Cork ..	5.	5	7
Total ..	18.	20	0

* The seed sown at these centres was obtained from the Albert Agricultural College, Glasnevin, Dublin.

County Extension Plots.

In previous years the seed Oats for County Extension plots was distributed through the Agricultural Instructors to farmers who were prepared to dispose of the produce for seed purposes. In order, however, to give seed merchants, who have been in the habit of importing Seed Oats, an opportunity to get their requirements grown in Saorstát Éireann, it was decided to distribute "foundation" stocks of pure line seed to such of them as were prepared to propagate these stocks. It was hoped that the produce would be used, not for ordinary seed purposes, but rather for further propagation in 1935, and that the firms concerned would have available, after the harvest of that year, considerable supplies of home-grown seed suitable to their requirements. It is proposed to allocate in each future season "foundation" stocks of pure line seed of suitable varieties to reliable firms who will be prepared to propagate them in accordance with the terms of the scheme. Approximately three hundred and forty barrels of Victory II were distributed from the Department's Cereal Station, Ballinacurra, Co. Cork, to the following firms :—

Mr. D. J. Bergin, 29-30 Smithfield, Dublin.

Mr. Garrett Byrne, Bree, Ballyhogue, Enniscorthy, Co. Wexford.

Messrs. F. A. Waller & Co., Banagher, Offaly.

Messrs. E. Dowley & Sons, Carrick-on-Suir, Co. Tipperary.

Messrs. T. McKenzie & Sons, Ltd., 212 Pearse Street, Dublin.

Messrs. John P. Hopkins & Son, Ltd., Wicklow.

Messrs. T. Wade, Straffan, Co. Kildare.

Mr. Christopher Bellew, 111 West Street, Drogheda.

Messrs. M. Rowan & Co., 51-52 Capel Street, Dublin.

Mr. A. McEntee, Castle Street, Ardee, Co. Louth.

Mr. J. J. Furlong, Little Graigue, Duncormick, Co. Wexford.

Messrs. McKenzies, Ltd., Camden Quay, Cork.

Mr. J. P. Kearney, Willville House, Riverstown, Dundalk, Co. Louth.

Messrs. W. Drummond & Sons, 57-58 Dawson Street, Dublin.

Messrs. D. E. Williams, Ltd., Tullamore, Offaly.

The Bride Valley Stores, Tallow, Co. Waterford.

Messrs. John H. Bennett, Ltd., Ballinacurra, Co. Cork.

The Albert Agricultural College, Glasnevin, co-operated with the Department in the working of the foregoing scheme, and approximately 130 barrels of Glasnevin Sonas and 24 barrels of Glasnevin Success which were produced at the College were distributed to the following growers :—

Major R. E. Barrow, Milestown, Castlebellingham, Co. Louth.

Mr. Ml. Quinlan, Bridge House, Knockaney, Bruff, Co. Limerick.

Mr. W. C. Meagher, Laha, Templemore, Co. Tipperary.

Mr. Christopher Monks, Coolquay, The Ward, Co. Dublin.

Messrs. McConville & Leonard, 18 Market Street, Trim, Co. Meath.

Mr. Ml. Murphy, Ballyneale, Clonea, Carrick-on-Suir, Co. Tipperary.

Mr. James Flanagan, Coolemount, Drumcondra, Dublin.

Mr. R. Barton, Glendalough House, Annamoe, Greystones, Co. Wicklow.

Mr. P. J. Howard, Cushnahouna, Ennis, Co. Clare.

Mr. Nicholas McDermott, Oldtown, Co. Dublin.

Mr. Philip O'Reilly, Raharney, Killucan, Co. Westmeath.

Mr. D. McGranaghan, Craggmores, Nobber, Co. Meath.

Mr. John Colleton, Curraclloe, Wexford.

The Manager, Enniscorthy Co-op. Society, Ltd., Enniscorthy, Co. Wexford.

Mr. J. P. O'Donovan, Couse, Waterford.

Mr. George Carroll, Coolkerky Park, Rathdowney, Laoighis.

Mr. E. Doherty, Manager, Ballaghadereen Co-op. Agrl. Society, Ltd.

Mr. G. H. Caulfield, 17 Dame Street, Dublin.

Mr. R. A. Kilroy, Clongill, Wilkinstown, Navan, Co. Meath.

Mr. P. J. Meagher, Kedrah Castle, Cahir, Co. Tipperary.

Mr. W. J. Grace, Tinniscully, The Rower, Co. Kilkenny.

Mr. John Kennedy, Jamestown, Borris-in-Ossory, Laoighis.

Mr. J. F. McCulloch, Gerrardstown, Ballyboughal, Co. Dublin.

Mr. P. Byrne, Co. C., Tristernagh, Ballincargey, Mullingar, Co. W'meach.

Mr. Bishop, c/o Messrs. J. Jameson & Sons, Ltd., Bow Street Distillery, Dublin.

Messrs. J. H. Bennett, Ltd., The Maltings, Ballinacurra, Midleton, Co. Cork.

Major E. M. Connolly, Castletown, Celbridge, Co. Kildare.

Mr. William Carroll, Tullamore, Kilshanny, Co. Clare.

Merchants who were provided by the Department with foundation stocks of seed oats under this scheme were required to make agreements with

growers so that the seed should be sown apart from other oat crops and otherwise treated so as to ensure that the produce would be suitable for further propagation. Merchants were also asked to furnish to the Department the names and addresses of the selected growers and, prior to harvest, the majority of the crops was inspected and reported upon as to suitability for seed purposes. In a few cases merchants failed to select suitable growers or to enter into a proper agreement with the growers selected and in a few other cases the selected growers failed to carry out the terms of their agreement to take adequate precautions to ensure that the produce would be suitable for further propagation. On the whole, however, the scheme was very successful and large stocks of pedigree seed were produced for distribution in 1935.

TABLE I.—LARGE SCALE BARLEY VARIETY EXPERIMENTS, 1934.

Centre	Name and Address of Grower	Description of Soil	Previous Crops	Date of Sowing	Date of Harvesting
1	Mrs. Tait, Hermitage, Rostellan, Co. Cork	Light Loam, Sub-Soil .. Shale ..	Oats, 1932 .. Turnips, 1933 ..	March 28 ..	August 7 ..
2	William Watkins, Coolnagrower, Fortal, Birr, Offaly	Light Loam, Sub-Soil .. Limestone ..	Barley, 1932 .. Roots, 1933 ..	April 12 ..	.. 20 22 ..
3	John Bryan, Dumbell, Kilkenny	Medium Loam, Sub-Soil .. Gravel and Limestone ..	Oats, 1932 .. Turnips, 1933 ..	.. 3 ..	.. 14 ..
4	Mr. Carroll, Belleen, Nenagh, Co. Tipperary	Medium Loam, Sub-Soil .. Limestone ..	Barley, 1932 .. Turnips, 1933 ..	.. 21 ..	.. 21 22 ..
5	Mrs. Segrave, Dunany, Dunleer, Co. Louth	Light Loam, Sub-Soil .. Gravel and Clay ..	Oats, 1932 .. Turnips, 1933 ..	.. 6 ..	.. 27 ..
6	N. Howlett, Ramsgrange, Co. Wexford	Stiff Loam, Sub-Soil .. Shale ..	Oats, 1932 .. Roots, 1933 ..	.. 11 ..	.. 17 27 ..
7	M. P. Minch, Rockfield House, Athy, Co. Kildare	Deep Loam, Sub-Soil .. Gravel ..	Barley, 1932 .. Turnips, 1933 ..	March 29 ..	.. 9 ..
8	J. Furlong, Ballygrangans, Kilmore, Co. Wexford	Sandy Loam, Sub-Soil .. Gravel ..	Oats, 1932 .. Potatoes, 1933 ..	April 9 ..	.. 13 ..
9	D. Morris, Tomahurra, Enniscorthy, Co. Wexford	Shaly Loam, Sub-Soil .. Shale ..	Wheat, 1932 .. Roots, 1933 ..	March 3 ..	.. 8 ..
10	D. O'Brien, Ballinamere, Tullamore, Offaly	Medium Loam, Sub-Soil .. Limestone ..	Oats, 1932 .. Turnips, 1933 ..	April 4 ..	.. 16 17 ..

TABLE II.—LARGE SCALE VARIETY EXPERIMENTS, 1934. YIELD AND VALUE OF GRAIN PER STATUTE ACRE.

CENTRE	SPRATT-ARCHER 37 No. 3					SPRATT-ARCHER 37 No. 4					HYBRID No. 1C					ABED REX x SPRATT-ARCHER				
	Yield of		Total* value including Screenings		Value per Barrel	Yield of		Total* value including Screenings		Value per Barrel	Yield of		Total* value including Screenings		Value per Barrel	Yield of		Total* value including Screenings		Value per Barrel
	Dressed Grain	Screenings	Bls. Sts.	Sts.	s. d.	Dressed Grain	Screenings	Bls. Sts.	Sts.	s. d.	Dressed Grain	Screenings	Bls. Sts.	Sts.	s. d.	Dressed Grain	Screenings	Bls. Sts.	Sts.	s. d.
<i>Cork:</i>																				
Mrs. Tait ..	9 6	9			14 5	9 8	9			14 4	9 13	11			13 10	9 7	12			14 2
<i>Tipperary:</i>																				
Mi. Carroll ..	11 7	1			14 8	11 15	1			14 8	12 4	1			14 3	10 8	1			14 7
<i>Kilkenny:</i>																				
J. Bryan ..	14 7	7			14 11	14 12	7			14 8	12 13	7			14 7	12 4	5			14 9
<i>Offaly:</i>																				
Wm. Watkins ..	8 9	7			14 5	9 3	7			14 10	10 10	3			14 4	9 12	2			14 8
D. O'Brien ..	13 12	5			14 4	13 11	6			14 2	13 15	5			13 11	12 9	4			14 3
<i>Kildare:</i>																				
M. P. Minch ..	11 0	2			14 4	10 10	2			14 2	11 2	2			14 4	9 12	1			14 8
<i>Louth:</i>																				
Mrs. Segrave ..	10 4	5			14 3	11 14	5			14 4	11 7	5			14 4	11 11	3			14 4
<i>Wexford:</i>																				
N. Howlett ..	10 11	7			14 8	11 8	8			14 4	11 15	4			14 8	12 0	8			14 7
J. Furlong ..	13 6	5			14 11	12 5	7			15 0	13 6	8			14 8	12 10	4			14 10
D. Morris ..	13 1	5			14 11	12 8	7			14 9	13 7	6			14 6	12 0	5			14 8
Total ..	115 15	53			—	117 14	59			—	120 12	52			—	106 7	45			—
Average ..	11 9	5			—	11 12	6			—	12 1	5			—	10 10	4			—

* Screenings valued at 6d. per stone.

TABLE III.—LARGE SCALE BARLEY VARIETY EXPERIMENTS, 1934. ANALYSIS OF PRODUCE.

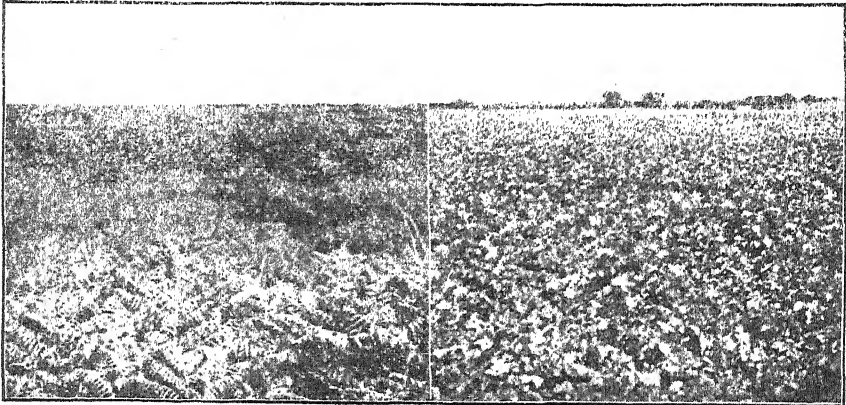
GROWER	SPRATT-ARCHER 37 No. 3				SPRATT-ARCHER 37 No. 4				HYBRID No. 1C				ABED REX x SPRATT-ARCHER			
	Moisture %		On Dry Matter		Bushel Weight	Moisture %	On Dry Matter		Bushel Weight	Moisture %	On Dry Matter		Bushel Weight	Moisture %	On Dry Matter	
	Bushel Weight		Wt. of 1,000 Corns	Nitrogen %			Wt. of 1,000 Corns	Nitrogen %			Wt. of 1,000 Corns	Nitrogen %			Wt. of 1,000 Corns	Nitrogen %
Mrs. Tait ..	51.7	20.6	36.5	1.87	51.9	21.1	37.5	1.95	50.1	21.8	40.4	2.04	52.6	20.7	40.5	2.09
Wm. Watkins ..	52.1	18.3	33.8	1.72	53.2	18.1	35.3	1.71	50.7	19.1	37.6	1.79	53.8	20.1	37.9	1.87
J. Bryan ..	55.4	17.9	39.4	1.59	53.9	20.3	40.1	1.70	53.6	18.3	42.0	1.78	55.6	18.7	40.1	1.95
Mr. Carroll ..	52.4	18.6	35.7	1.62	53.3	18.1	36.5	1.67	51.1	18.1	38.3	1.67	54.0	18.3	39.0	1.78
Mrs. Segrave ..	53.9	18.7	34.9	2.01	54.5	19.2	37.6	2.09	54.0	18.6	39.0	1.98	54.5	18.6	33.7	2.16
N. Howlett ..	51.8	18.6	32.7	1.42	51.5	19.9	33.0	1.52	52.6	18.3	37.7	1.56	53.9	18.1	34.9	1.65
M. P. Minch ..	52.4	17.3	34.4	1.75	53.2	17.3	34.8	1.72	52.4	17.4	39.2	1.76	54.3	17.9	33.2	1.92
J. Furlong ..	54.5	19.1	35.6	1.47	54.1	19.9	35.9	1.50	54.5	19.1	40.4	1.52	54.9	19.4	36.9	1.68
D. Morris ..	54.4	17.1	35.8	1.80	54.9	16.9	35.5	1.75	52.9	17.0	39.4	1.96	55.6	16.9	37.6	1.97
D. O'Brien ..	53.0	18.7	37.9	1.98	52.9	18.6	35.7	2.11	51.7	18.7	41.0	2.06	53.8	18.4	40.6	2.23
Average ..	53.2	18.5	35.7	1.72	53.3	18.9	36.2	1.77	52.3	18.6	39.5	1.82	54.3	18.7	38.0	1.93

SEED POTATOES FROM BOG LAND.

By

W. D. DAVIDSON, B.A., B.Sc.

"The same practice prevails in Ireland; seed that has been grown on BOGS—often planted so late as June, and the produce of which is dug out in October—is always preferred for soils of a different quality from that in which the stock was raised."—MARTIN DOYLE, 1849 (see page 42).



ATHLONE BOG LAND BEFORE AND AFTER RECLAMATION.

(Unreclaimed bog visible in background on the right).

Variety of Potato—EARLY ROSE. Over 50 years without a change of seed.

The bogs or peat mosses of Ireland form a remarkable feature of the country. Bogs are composed almost exclusively of partially decayed vegetable matter, and usually contain a super-abundant supply of moisture which they absorb like a sponge.

Out of a total area of about 20,000,000 acres in Ireland, the area of bog is estimated at 2,830,000 acres or nearly one-seventh of the entire surface of the island. Of these bogs there are 1,576,000 acres of flat bogs, the remaining 1,254,000 acres being mountain bog. The former are spread over the central portions of the great limestone plain, and comprise a belt from east to west across the centre of Ireland, narrow at the eastern coast and gradually widening as it approaches the western ocean, while the mountain bogs are principally distributed through the hilly country which ranges along the coast.

The central division is traversed from north to south by the Shannon, which thus divides the great system of bogs into two parts, the greater part lying west of this river. The natural vegetation of bogs consists chiefly of various species of heather and moss.

In the process of reclaiming bog land, potatoes are usually the first crop that is grown. The belief that benefits are secured by procuring seed from soil of a nature different from that in which the seed is to be planted, has existed for many years. In 1757 Maxwell (1), the earliest writer to refer to the advantage of a change of seed, says: "In Galloway we find that potatoes for seed, as well as other seed, require changing, not only from one ground, but also from one country to another, so, when we have opportunity of purchasing any from England or Ireland, we chuse them, and find that the produce is greater than from our own potatoes."

Very soon afterwards, preference was given to seed from moss or peaty land wherever such land existed. One writer advises "the use of such sets to be planted as grow in moss-land, and there will not be a single curled one the first year. This is affirmed by the inhabitants of two townships, where they grow amazing quantities" (2).

The most outstanding of all the earlier writers on the potato—James Anderson (3)—says: "It has been said that potatoes which are taken up before they attained perfect maturity infallibly become affected with this disease (curl); but in some cold mossy soils, and exposed situations, where the potatoes must often be taken up while they are yet in a state of vigorous vegetation, the disease (curl) is scarcely known."

Seed from the moorlands was recommended in Yorkshire by Marshall (4) in 1788, and Pryce (5), eight years later, made the same recommendation. He says seed potatoes should be procured from "damp morassy land . . . as they will not curl the first year after planting."

Dubourdieu (6), in 1802, says: "Turf bogs and moory grounds seem to possess the quality of preserving potatoes from degenerating, as well as that of throwing out considerable crops, and in this country when these soils are frequently applied to their culture, the curl is little known, and frequent applications of a change of seed are made from other parts, where this advantage is not enjoyed." The same writer says: "Of the cause of curled potatoes I have never yet heard satisfactory account, but I think I can say that frequent changes from boggy and moory soils to those of a different quality are found the best preventitive."

Coote (7), in 1802, writes: "Time of planting—from March to the latter end of May in uplands, and from May till the middle of June in moist or boggy soils. In this kind of soil, potatoes are often planted to change the seed, which, from long sowing in upland, will degenerate, and this effectually answers the purpose."

The same practice is still carried on in many localities in Ireland.

Sir John Sinclair (8), in 1828, writes : " It is a practice of the Lancashire planters to send some of their favourite kinds to the mossy grounds to recover, if they are found to have a tendency to Curl, and it is certain that potatoes from mossy land will not curl."

The Rev. William Hickey, an Irish writer, in 1839, under the pseudonym " Martin Doyle," says : " The seed grown upon bog or moorland, though as wet as a sponge, has produced the most abundant crops and of a dry and mealy quality too, on soil of a *different* composition ; and though the careful Scotch farmer changes the seed of the potato frequently, it is remarkable that the grower on the moors and mosses continues to plant from his original stock without any change of seed. The nature of this potato, full of sap, is so well understood by the Scotch, that the supplying of the lowlands with seed from the moorland farmer, has become a regular system, and to the advantage of both parties ; the latter obtaining a much higher price for his watery seed than is obtained for the most farinaceous potatoes in the market, and without even the trouble of conveying them thither, the purchaser of the seed being at the expense of cartage—sometimes to a very *considerable distance*."

The same practice prevails in Ireland ; seed that has been grown on bogs—often planted so late as June and the produce of which is dug out in October—is always preferred for soils of a different quality from that in which the stock was raised." (9). This remark was as true in 1935 as it was in 1839.

A Scottish writer (10), in 1837, says : " Potatoes intended for seed the following year should be planted on new damp or mossland."

An Irish writer (11), a few years later, says : " The disorders to which the potato is liable are dry rot, curl and scab. The first of these, which is most dangerous, makes its ravages among our old mellow varieties, corroding them as a canker commencing where some bruise, scab or wound has effected an opening on the rind or skin of the tubers . . . (Old varieties of the potato are not so liable to dry rot when grown on bog, moor or mountain land.)"

The same writer says : " The farmer should endeavour to have his potatoes for seed from moor or mountain soils, and if such cannot be procured, from mellow fresh ones, always avoiding seed from worn-out land."

Baldwin (12), the leading agricultural educationist of his time, writing in 1867, says : " Reclaimed bog or moory land gives the best seed potatoes."

Many other references could be quoted, but the foregoing are sufficient to show that a very widespread belief has existed for 150 years that the best seed is obtained from bog or moorland.

The results of experience only can account for such a universal belief. It is doubtful if there is a potato-grower in Ireland who would not take bog-grown seed in preference to seed from any other type of soil. Buyers of seed potatoes for Malta and Cyprus definitely specify that the seed must

be from bog land. Bog seed is not widely known in England, but some merchants who have purchased it recognise its merits. The question will naturally be asked, is bog-grown seed preferable to seed from any other type of soil, and if so, what are the reasons for its superiority? These questions are not easily answered. Scientific research work carried out during the past twenty years has definitely shown that such diseases as Leaf Roll and the various forms of Mosaic are largely, if not entirely, responsible for the lack of vigour and reduced yield which have appeared in a number of well-known varieties. The necessity experienced in certain districts to change seed frequently in order to maintain an abundant crop is traceable to the same cause. It obviously follows that the productivity of seed potatoes very largely, perhaps entirely, depends on their freedom from these diseases. Experience has shown that these diseases are not so evident in the bogs in central Ireland as in other classes of soil. The cause of this comparative freedom may be explained by the very recent discovery of Maldwyn Davies, working in Wales. This worker showed that the aphid *Myzus persicae*, which is largely responsible for spreading Leaf Roll, is very inactive under moist conditions. Such conditions usually prevail in the bogs in Ireland. Apart from a high rainfall of at least 56 inches, the bog soil holds moisture like a sponge and parts with it slowly. No other type of land produces such marvellous foliage, which in itself helps to keep soil about the plants from becoming parched. The amount of disease may also be kept in check by the huge foliage produced by the healthy plants smothering completely any delicate plant so that it could not produce any tubers of seed size.

The fact that varieties can retain their vigour for a very long period is the best proof that the bog soils of Ireland are particularly suitable for the production of seed. One example may be cited. The variety Early Rose has been grown on bog land near Athlone without being changed during a period longer than any resident of the district can remember. This variety was raised in America in 1867, but the date when it reached Athlone is not known. It is grown with wonderful vigour to the present time. In the Spring of 1932, six tons of this variety were sold to a grower in Kent. In June the grower complained that he had been supplied with Kerr's Pink instead of Early Rose. When the writer of this article called to examine the crop, he found it to be wonderfully vigorous, and definitely genuine Early Rose. The grower could not believe that an early variety could produce such foliage. In South Lancashire, where most of the soil is dark coloured, a prejudice exists against seed from black land. In 1935 Ninetyfold, from the Athlone bog, was planted in the Ormskirk district, and the grower's comment on the seed was that it had done "remarkably well."

Equally favourable comment was made on some May Queen seed sent from the same bog to Cornwall in the Spring of 1935.

Very satisfactory reports regarding bog seed have also been received from France,

Apart from its vigour, the appearance of bog seed is usually very attractive. It grows free from brown and corky scab except where the bogs have been dressed with lime or marl.

It is only within the last twelve years that an effort has been made to have seed potatoes grown under systematic supervision on bog land. Previous to that time whatever quantities were grown were usually impure and not true to name. A small industry had existed around Athlone (13) for many years, but, for the reasons mentioned, the industry was all but extinct, when steps were taken by the Department of Agriculture in 1923 to revive and expand the trade.

The annual output from the Athlone area is now about 2,500 tons, and up to the present time no difficulty has been found in disposing of this seed.

The area grown on bog is being extended along the river Shannon and also in other directions. It has been observed that wherever this seed goes, the demand for it increases.

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VERNALIZATION, ITS PRINCIPLES AND PRACTICE.

By M. CAFFEY and P. T. CARROLL, University College, Dublin.

Vernalization, or iarovization, is a method of seed treatment employed with the object of accelerating the development of plants. It is claimed that when submitted to this process winter varieties of wheat, and of other cereals, can be safely grown from spring sowings, and that even certain species of tropical plants, which normally do not produce seed or even inflorescences when grown outside their own habitat, can be successfully propagated under natural conditions in northern latitudes.

The vernalization process naturally implies that the period required by certain plant species to complete their life cycle can be arbitrarily accelerated. This is a comparatively new discovery in plant physiology. It was believed, until quite recently, that the successive changes in structure and function which plants undergo in their progress from the seed stage to the seed ripening stage were constant, unalterable and conditioned solely by the hereditary constitution of the organism. It is, however, of interest to recall, in this connection, that a method of seed treatment of winter wheat varieties, in which the seed, soaked in water, was frozen for some time before sowing, and which it was alleged enabled them to be sown in the spring, was accidentally discovered and practised by American farmers more than a century ago (1). This is an interesting demonstration of the claim frequently advanced that, as regards agriculture, practice is ahead of science. Apparently, however, the method referred to was not a financial success, for it soon fell into disuse and was eventually forgotten.

Klebs (2) was the first modern investigator who definitely challenged the prevailing conception that the cycle of plant development was unchangeable. According to his views the reproduction of plants, as well as their other life processes, is definitely subject to external conditions. By altering these conditions the course of plant development can be correspondingly changed. Working on flower formation on *Sempervivum*, Klebs distinguished three distinct phases in the development of that plant, viz.—(1) pre-flowering stage (2) formation of flower rudiments, (3) development of flower inflorescences. For the first stage low temperature and intensive illumination were necessary; for the second stage, continuous light was desirable but the intensity of illumination could be low; while the third stage could be completed in darkness provided that the plants were sufficiently well grown when entering on this stage.

Garner and Allard (3) have shown that the period of daily illumination which a plant receives during its period of active growth is a most important factor in influencing its development. In experiments carried

out by them in 1918 and 1919 a late flowering variety of Soya Bean (*Bilori*), which normally requires 110 days to reach the flowering stage of development when sown in the middle of May at Washington, D.C., under full daylight (12½–15 hours), required only 26 days to reach a similar stage when the period of illumination was reduced to 12 hours daily. Similar and equally striking results were obtained with certain varieties of tobacco, ragweed, climbing hempweed and aster. A further reduction in the period of daily illumination did not further accelerate the attainment of the flowering stage, but, as might naturally have been expected, the growth of the plants was much reduced.

Plant species typical of the tropical regions: maize, millet, soya bean, sorghum etc. are favoured by short-day conditions, *i.e.* not exceeding 12 hours sunlight per day. On the other hand, the plants which have originated in northern latitudes require lengthened periods of sunlight during their growth and make the most rapid development under conditions of long or even continuous day. They are known as long-day plants, and if submitted to short-day conditions their development towards the reproductive stage may be completely arrested. Garner and Allard (4) have been able to prevent two plant species—*Sedum Spectabile* and *Cassia Marilandica*—from flowering for a period extending over 9 years in each case, by restricting the illumination to 12 hours daily. At the end of this period the plants were grown under conditions of unrestricted sunlight and flowered normally and at the usual period.

Lubimenko and Shcheglova (5) have recently shown that the placing of young seedling plants under short-day or long-day conditions for some days after the commencement of active growth has an influence on the time of flowering, even if the plants continue growth subsequently at another combination of light and darkness. They found that the action of short-day conditions for a period of from 4 to 10 days during the early stages of growth was sufficient to accelerate the subsequent development of short-day plants even if they are then grown under long-day conditions. On the other hand, a similar duration of short-day conditions will produce retardation in the development of long-day plants even if they are later exposed to long-day conditions. This phenomenon, which they call "photo-periodic induction," makes it clear that, in order to accelerate or retard the onset of the reproduction stage of development in certain species of plants, it may only be necessary to subject them to short-day or long-day conditions, as the case may be, for a comparatively limited period during their early stages of growth.

Naturally it is not possible to subject plants growing in the open field to artificial restrictions as regards the relative lengths of illumination and darkness, and in consequence Garner and Allard's method of influencing plant development is not one which can be commercially exploited in agriculture because it can only be applied to a limited number of plants, and even then only under conditions where there are available adequate greenhouse and darkroom accommodation. The same objection, but to

a lesser degree, applies to Lubimenko and Shcheglova's method. Recently, however, Dr. Lyssenko and his co-workers have asserted that the necessary acceleration of a plant's developmental processes can be brought about in a much simpler way, viz.--by subjecting the seed which has just begun to germinate to certain treatments appropriate to the species being dealt with. This method of seed treatment is now known as *Vernalization* or *Iarovization*.

The essential features in which Lyssenko's theory differs from that of his predecessors in this branch of research are (1) the emphasis he lays on the distinction between growth and development which he regards as being separate and indeed independent processes uncorrelated as regards time, and (2) the view that the necessary stimulus which a plant requires to enable it to proceed to the reproductive stage can be conveyed to the plant in one continuous operation while it is in the early stages of germination. For example, in respect of light requirements it is, according to Lyssenko, the total quantity of darkness which short-day plants receive that is important, rather than the alternation of short-day long-night periods as had been previously supposed. Short-day plants can, according to this theory, be successfully subjected to the necessary amount of darkness requisite for development in one continuous period after which they can be successfully grown under long-day conditions. In winter varieties of wheat, which is a typical long-day plant, the essential requisite in the early stages is stated to be low temperature, and this can be conveyed to plants in the seedling stage. They can then be sown in spring.

Lyssenko in a recent publication has briefly formulated his views as follows :

1. Growth and development are not identical phenomena.
2. The process of development of a seed plant consists of separate stages.
3. The stages always proceed in strict sequence and each stage must be completed before the subsequent stage can be begun.
4. Different stages of development of the same plant require different conditions.

Lyssenko believes that there are in all five stages of development, but only two have been studied by him. The first stage, known as the vernalization stage, may take place in a plant which has just begun growth. The most important factor here is temperature. Winter wheat and other winter-sown cereals, as has been stated, require a low temperature, others like soya bean require a high temperature, but in every case an adequate supply of oxygen and moisture to sustain germination must be available. Different plant species and even different varieties of the same species require different periods of time for the completion of this stage. The second stage is known as the photo-stage. Short-day plants need darkness, long-day plants need light for the completion of this stage. Again, different varieties

of a plant may require different doses of these factors. It is important to note that both these stages may be completed while the plant is a seedling. The remaining stages, which have not been so far fully investigated, are apparently tolerant of wide differences in temperature and sunshine.

The actual vernalization process is comparatively simple. The seeds are soaked but the amount of water which they are allowed to absorb is definitely below their water holding capacity. In wheat, the moisture content at the commencement of the vernalization process should not exceed 50 per cent. of the dry weight of the grain. This limitation as regards the amount of water added to the seeds slows down germination and thus permits of the vernalization treatment being confined to the seed stage. Moreover, and this is a very practical point, the growth of rootlets and shoot is practically inhibited: in consequence, vernalized wheat is not different in shape from ordinary untreated wheat and can be sown with an ordinary seed-drill.

When the embryos have started growth they are subjected to the appropriate temperature. Winter wheat varieties are maintained at 3—5°C for 15 days, after which they are ready for sowing in the open field. The requisite temperature and the period of treatment of some of the most valuable short-day plants have been determined and are as follows:—

Maize	..	..	20–30°C	during 10–15 days	.
Millet	..	..	25–30°C	„ 5 „	.
Sudan Grass	..	..	25–30°C	„ 8–10 „	.
Sorghum	..	..	25–30°C	„ 8–10 „	.
Soya Bean	..	..	20–25°C	„ 10–15 „	.

During treatment short-day plants are covered so as to exclude light.

It is claimed that the vernalization treatment has proved to be most successful in Russia and the area annually sown with seed so treated amounts to hundreds of thousands of hectares. In other countries the results obtained from vernalization tests, in which the technique recommended by Lyssenko has been followed accurately, have been conflicting and have not on the whole confirmed the results obtained by the Odessa workers. In the experiments carried out on the Albert Agricultural College farm, which are set out below, the vernalization treatment was ineffective when applied to barley, soya beans and maize and only partially effective when applied to certain winter wheat varieties.

On the 12th March, 1934, small lots of two well-known commercial varieties of winter wheat—Queen Wilhelmina and Yeoman II—were prepared for vernalization. The percentage of moisture in the grain of each variety was ascertained and the amount of water that it would be necessary to add to bring the moisture content to 50 per cent. of the dry weight was then calculated. Before the addition of the water the wheat was placed in weighed containers. In accordance with the technique set out for the vernalization

of long-day plants, the water was added to the grain in three successive applications by sprinkling, a watering can fitted with a fine rose being used for this purpose. The intervals between successive sprinklings were 8 hours and during this period the grain was kept at room temperature.

This method of application did not prove to be entirely satisfactory and it is doubtful whether it could be used on a large scale. The water on application ran down to the bottom of the container forming a pool there, and in consequence, the grain had to be stirred repeatedly so as to secure uniform absorption of moisture. Moreover, there was quite a considerable amount of evaporation during this process and much more than the calculated amount of water had to be applied to the grain to bring the moisture content to 50 per cent. of the dry matter.

In view of these difficulties it was decided to ascertain whether it would not be advisable to steep the grain in preparation for the vernalization process. Accordingly, a small quantity of Queen Wilhelmina was steeped for 24 hours at 15°C. after which the grain was treated in every way similar to that of the sprinkled grain. Steeping of the grain would be a far simpler and easier process, if feasible, and it would be quite a simple matter to ascertain by experiment within reasonable limits the amount of time necessary for wheat containing say 16 per cent. of water to reach a moisture content of 50 per cent. of the dry matter of the grain at a given temperature.

Four hours after the final sprinkling, and when the water had all been absorbed, the damp grain was spread out in a thin layer in a room kept at 14.5°C. for a period of 24 hours. At the end of that period the young embryos had commenced to grow. This was very noticeable in the case of Yeoman II which evidently germinated more rapidly than Queen Wilhelmina. The germinating grain was then put into a well-ventilated cold chamber and the temperature maintained constant at 3°C.

The grain was turned frequently while in the cold chamber. There was a slight growth of moulds, especially during the first few days of the low temperature treatment but this trouble was eventually overcome by more frequent stirring and better aeration. Very probably the inevitable loss of moisture from the grain provided increasingly unfavourable conditions for mould development.

In order to avoid the possible adverse effect of photo-periodic induction during the low temperature process the grain was illuminated by electric light from the 17th to the 29th March, when the grain was removed from the cold chamber.

At the end of 15 days the grain of both varieties was in fairly sound condition. Rootlets were visible on the Yeoman II, but Queen Wilhelmina had made little growth. A few of the grains of the latter variety had died, and some of them had developed a reddish tinge, probably due to bacterial growth. It was clear that grain intended for vernalization purposes must be sound and reasonably free from disease, especially if the cold chamber

cannot be fully ventilated. It is possible that it might be advisable to add a small percentage of some disinfectant not harmful to plant growth—*e.g.* Germisan—in the water used in sprinkling or steeping the grain previous to vernalization. This is a matter which might repay investigation.

Part of the vernalized seed of each variety was sown on the 29th March on the Albert Agricultural College farm alongside a control plot of untreated seed in each case. The remaining vernalized seed was divided into two portions, one of which was air-dried at room temperature and then stored away, and the other kiln-dried, the moisture content of the latter being brought down to 13 per cent., after which it was stored. After a fortnight's storage both air-dried and kiln-dried vernalized seed of both varieties, together with their controls, were sown in plots on the Albert Agricultural College Farm, Glasnevin, Co. Dublin. The vernalized seed came over ground before the untreated seed. There was no difference in this respect between the air-dried and kiln-dried plots. Concurrently germination tests were carried out on the air-dried samples in comparison with their controls. The following results were obtained :—

Yeoman II (control)	..	..	..	99 per cent. germination
„ (vernalized and air-dried)	..	98	..	..
Queen Wilhelmina (control)	..	..	97	..
„ „ (vernalized and air-dried)	..	94	..	..

It would appear from these results that the vernalization process had not significantly reduced the germination capacity of the grain and that vernalized seed, if made sufficiently dry, can be stored for a period of at least a fortnight.

Under field conditions the initial superiority attained by the treated plots was soon lost and observations made on the 23rd April showed that there was no difference between the different plots of either variety. Soon after this both vernalized and control plots assumed the recumbent habit of growth characteristic of winter varieties and were in striking contrast with the erect habit of growth of spring types growing contiguously.

All through April and until the end of May treated and untreated plots both of Queen Wilhelmina and Yeoman II remained in the grass-corn stage. On the 29th May, however, the vernalized plots of each variety, including the plot of Queen Wilhelmina which was steeped before vernalization, were observed to be forming flowering shoots. This particular stage of development was not reached by the unvernallized plots until 10 days later. From this period until harvest the vernalized plots were more forward than their control but the former were, however, three weeks behind such typical spring varieties as Marquis and April Red in ear exertion.

The treated and untreated plots of Queen Wilhelmina and Yeoman II were harvested on the 31st August. On that date the vernalized plots were ripe, the unvernallized plots were noticeably greener in the straw and if

the latter had been allowed to stand they would have required about 5 more days to ripen thoroughly. The unvernallized plots ripened well in the stook and when stored for threshing there was no difference as regards maturity between the treated plots and the controls. Owing to the depredations of birds during the early stages of growth it was not considered advisable to record the actual yields per plot but it may be said that neither the vernallized nor the untreated plots of either Queen Wilhelmina or Yeoman II compared well in this respect with the best of the spring varieties.

The result of this preliminary experiment on the vernallization of two varieties of wheat showed that their vegetative period was shortened and the onset of their reproductive processes accelerated by the process. The effect, however, was not sufficiently great to bring these varieties into the spring wheat class. They were in fact much later in coming into ear than the latest of the spring wheats, Red Marvel.

Martin (*loc. cit.*), Peltier and Kiesselbach (6) and others have recently shown that some varieties of winter wheat require a much longer period than 15 days low temperature treatment to enable them to pass through the vernallization stage. It was, therefore, regarded as possible that the comparative ineffectiveness of the process as regards Yeoman II and Queen Wilhelmina might have been due to the non-completion of the vernallization stage in the cold chamber. It was decided that, in the tests which were repeated in 1935, the cold temperature treatment should be extended by four weeks, *viz.* to 43 days. Two other varieties, *viz.*, Ironmaster (*T. vulgare*) and Kubanka (*T. Durum*) were included in the 1935 experiment.

Samples of Yeoman II, Ironmaster, Kubanka and Queen Wilhelmina were taken on the 30th January, 1935, put into containers and the amount of water necessary to bring the moisture content of the grain to 50 per cent. of the dry weight was applied in each case. On February 1st, one-half of the soaked seed of each variety was sown as a control plot in the open field. The remaining lots were kept at room temperature (15°C.) until February 4th when they were transferred to a cold chamber in which the temperature was maintained at 4°C. After 15 days treatment, there was some root growth and in order to check this, the temperature was decreased to—3°C. as from 15th February—March 1st. From March 1st until March 19th when the treatment was concluded, the temperature was kept at 4°C.

The four vernallized samples together with four samples of untreated seed of the same varieties were sown in plots in the open field contiguous to the controls on the 19th March. On this date the controls were well overground. Subsequently, growth was satisfactory in the case of each of the plots but in regard to development there was a distinct difference between Kubanka, which is a spring type, and the remaining three varieties, which are typical winter wheats. Kubanka ripened from all sowings, and vernallization had apparently no appreciable effect, the dates of ear exsertion of the vernallized and unvernallized plots of this variety sown on March 19th being 29th June and 1st July respectively.

The plots seeded with untreated seed of the three winter varieties sown on the 19th March were green on September 4th and, consequently, may be regarded as having definitely failed to complete their development within the limits of the growing season. The vernalized plots seeded on the same day did ripen, however, but only at the end of the growing season. On the other hand, the control plots sown on February 1st were at all periods, not only better grown, but also reached the ear exsertion and seed ripening stages at least 10 days earlier than the plots sown with vernalized seed. The actual ripening dates were as follows:

Winter varieties	sown 1/2/35	ripened 25/8/35
.. .. (vernalized)	.. 19/3/35	.. 4/9/35
.. .. (untreated)	.. 19/3/35	did not ripen
Kubanka—all plots	.. ..	ripened 20/8/35

The results of the 1935 experiments on the vernalization of winter wheat confirm those obtained in the previous year, namely, that plots sown with seed that had been subjected to that particular process will make more rapid development than similar plots seeded with untreated seed if both are sown at the same time in mid-spring. The effect of the treatment was again insufficient to bring any of the three winter varieties—Queen Wilhelmina, Yeoman II and Ironmaster—into the spring wheat class either as regards time of ripening or productivity. In view of these results and because, moreover, there are a number of true and prolific spring varieties now available, the vernalization of winter varieties with a view to enabling them to be grown from spring sowings does not appear to be a feasible proposition in this country.

It is also clear, from the experiments conducted during the past two seasons, that vernalization cannot be regarded as having accelerated development in the case of the winter varieties referred to, if the time taken in the cold chamber to complete the process be taken into account. The control plots sown on the 1st February, 1935 took 206 days in the ground to attain full ripeness, whereas the vernalized plots were 169 days in the ground. If, however, the 43 days spent in the cold chamber during which development was taking place be added to these, a total of 212 days is obtained. Vernalization, therefore, only succeeded in shortening the time spent in the field at the expense of a longer period spent in low temperature treatment. It is, therefore, equivalent to the gardener's method of sowing tender crops under glass early in the year and later on transplanting in the field when the danger from frost damage has passed. Wheat is not a tender plant, however, and as the climatic conditions obtaining in this country permit it to be sown at any period from autumn to spring it is more feasible to sow the seeds directly than to submit them to the low temperature treatment.

VERNALIZATION OF BARLEY.

An experiment was carried out in 1934 to determine whether vernalization would have any effect on Spratt-Archer 37 No. 3, a very prolific and otherwise suitable variety for growing in this country but which is slightly late in ripening. The treatment was similar to that employed for winter wheat. After vernalization the grain was sown on the 29th March, alongside an untreated plot seeded on the same day. Both plots behaved alike during all stages of growth and ripened their grain at exactly the same time. The treatment to which Spratt-Archer 37 No. 3 was submitted was therefore ineffective in accelerating development, but it did not depress the percentage of germination of the grain.

VERNALIZATION OF SHORT-DAY PLANTS.

Small samples of eleven varieties of maize and one variety of soya beans were vernalized in the spring of 1934 for a period of 15 days in accordance with the technique recommended for these particular plant species. It was found that the treatment had a very adverse effect on the germination capacity of the grain, and over 90 per cent. of the soya beans and at least 60 per cent. of the maize were killed in the process. The seeds became musty and moulds and bacteria developed rapidly during the period spent in the hot air chamber. The treated seeds when sown in the open field alongside a control plot, in the case of each variety, grew and developed exactly the same as the controls and there was no acceleration whatever of the reproduction and ripening stages of development. Evidently in this case either the treatment was not correct, or the particular varieties used were unresponsive to the treatment, or perhaps the soil and climatic conditions obtaining in the district in which the experiments were carried out, where the daily period of sunshine in mid-summer is 17 hours, were sufficient to nullify any acceleration effects the vernalization treatment might have on the varieties tested.

SUMMARY.

Experiments on the vernalization of winter wheat, barley, maize and soya bean were carried out during the years 1934 and 1935 on the Albert Agricultural College Farm, Glasnevin. The development of the wheat varieties tested was slightly accelerated by the treatment, but the development of the maize, barley and soya bean varieties tested was neither accelerated nor retarded. The treatment had no adverse effect on the percentage of germination nor on the rapidity of germination in the case of winter wheat and barley—there was in fact some evidence that the plots of these species seeded with treated seed braided better—but it had a very adverse effect on the maize and soya bean varieties used, as over 60 per cent. of the former and 90 per cent. of the latter failed to grow when sown in the open field.

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THE EFFECTS OF TAR ON THE GERMINATION OF WHEAT SEED.

By H. A. LAFFERTY, F.R.C.Sc.I.

Tar has long been recognised as a preventive against the attacks of birds and rodents, and though it is gradually being superseded by certain proprietary preparations it is still commonly used as a dressing for wheat seed. It would appear, however, that some farmers have met with serious loss by acting on the assumption that the benefits accruing from its use are in direct proportion to the increased amounts of tar applied. One case, which may be taken as typical, was enquired into where a crop of wheat failed to braird satisfactorily, though the seed showed a germination of 100 per cent. when tested at the Department's seed testing station at the time of purchase. The land appeared to be suitable for wheat-growing, and the preliminary agricultural operations in connection with its preparation and the sowing of the seed were carried out under favourable conditions. The enquiry progressed very slowly; in fact, no explanation was forthcoming for the partial failure of the crop, until the farmer volunteered the information that he treated the seed before sowing with "two or three pints of hot tar per barrel to keep the crows away". While it was not possible to say with certainty that the amount of tar used was excessive and positively harmful, it looked suspicious, and, in the absence of definite information on this point, the question of the use of tar as a dressing for wheat seed was examined in some detail.

As a drastic preliminary trial, one hundred wheat grains were heavily coated with commercial tar and put to germinate in sand saucers, as is done in ordinary routine practice. One hundred untreated seeds from the same sample were also germinated, and counts of both lots were made at intervals. At the end of ten days, which is the normal test period for cereals, the untreated control seeds showed a germination of 100 per cent., whereas only 13 per cent. of the tarred seeds had germinated in the same time, thus indicating that tar was undoubtedly injurious as a dressing for wheat seed when used in certain quantities.

It may not be out of place at this stage to point out that seeds treated with tar are "tacky" and inclined to stick together, with the result that a considerable amount of difficulty is generally experienced in sowing them, especially where a corn drill is used. To overcome this, however, such seed is usually further treated with lime, or other finely powdered material, which acts as a drying agent and enables the seed to run more easily through the sowing machine. While the primary object of these investigations was to examine the effects of various dressings of tar on the germination of the seeds, the opportunity that presented itself of studying the effects of lime and some other drying agents was also availed of.

Twelve half-pound lots, from a bulk of Queen Wilhelmina seed, were weighed out and treated as described in Table I. In this, as in most other

trials, the tar was applied at the rate of so many cubic centimetres per half-pound of seed, each c.c. corresponding to a dressing of one pint per barrel. The requisite amounts of tar were carefully measured, and to ensure that all the grains were well coated, the treated seeds were shaken up in a container for approximately two minutes. Where lime was used as a drier a surplus quantity was added to the treated seeds, which were then further shaken, the excess of lime being removed by means of a sieve. When all the treatments were completed, and before the tar on the unlimed lots had dried, five hundred seeds from each series were germinated in sand saucers.

TABLE I.

Showing the effect of various tar treatments, with and without lime, on the germination of wheat seed.

Seed Treatments					PERCENTAGE OF GERMINATION			
					3 days	7 days	10 days	35 days
Untreated					91	98	99	99
Dusted with lime					95	97	97	97
Tar {	One pint per barrel				53	89	92	98
	Do. plus lime				66	97	97	97
	Two pints per barrel				2	76	85	91
	Do. plus lime				6	84	91	92
	Three pints per barrel				0	44	62	72
	Do. plus lime				1	75	83	88
	Four pints per barrel				0	15	30	47
	Do. plus lime				0	35	61	70
	Eight pints per barrel				0	0	16	20
	Do. plus lime				0	6	37	48

As may be seen from the results which appear in Table I., the germination of the tar-treated seeds was affected to a greater or lesser extent depending on the amount of tar used, and also on whether or not lime was used as a drying agent. With regard to the quantity of tar used, it is also evident from an examination of the figures obtained for the interim germination counts that tar at the rate of one pint per barrel impaired the germinating energy of the seed, but by the end of a normal ten-day test period the total decrease in germinating capacity was small, or even absent, where lime was used. As the amounts of tar increased, both the interim and final germination counts decreased to such an extent that it was decided to rule out of further consideration all dressings where the rate of application was greater than three pints per barrel.

Possibly the most striking result that emerged from this trial, and one that was not anticipated, was the beneficial effect of lime on the germination of the seed. In every case the tarred and limed seeds had a higher germinating energy and a higher germinating capacity than the corresponding unlimed lots, though only where the lighter dressings were used was the compensatory effect of the lime sufficient to undo completely the injury caused by the tar. The germination tests were continued for thirty-five days, but the total increases between the tenth and thirty-fifth days were very slight. At this stage the experiment was concluded, as the ungerminated seeds which remained on the dishes were decayed and mouldy.

As a check on the trials just described and also to introduce a growing test in soil, half-pound lots of seed from a bulk of Marquis wheat were treated with tar, or with tar and lime, at the rate of one, two and three pints per barrel. Two lots of this seed were also treated with the prescribed amounts of a proprietary preparation (see x Table II.) which is recommended as a preventive against birds, and, as had been done for the tar-treated lots, one of these was also dried with lime. Five hundred seeds from each series were tested for germination, and at the same time two hundred seeds from each were planted in pots of soil and kept in a cool greenhouse. The results of the germination trials, which appear in Table II., confirm in a general way the earlier findings and indicate that the use of commercial tar as a dressing for wheat seed entails the risk of considerable injury where the quantity of tar used exceeds one pint per barrel of seed. It would also appear that two pints of tar per barrel of seed did not depress the final germination figures very seriously, but, in view of the fact that these trials were carried out with small quantities of seed and with much greater care than could possibly be taken in ordinary farm practice, it would be unwise to press this claim unduly, especially when the results of the growing tests are taken into account.

TABLE II.

Showing the effect of tar and a proprietary preparation, with and without lime, on the germination of wheat seed.

Seed Treatments						PERCENTAGE OF GERMINATION			
						4 days	7 days	10 days	14 days
Untreated	..	..	..	..	..	99	99	99	99
Dusted with lime	..	..	..	..	..	98	98	98	98
Tar	{	One pint per barrel	..	..	..	92	96	96	98
		Do.	plus lime	..	..	95	99	99	99
	{	Two pints per barrel	..	..	..	65	88	90	93
		Do.	plus lime	..	..	91	98	98	98
	{	Three pints per barrel	..	..	..	16	60	64	67
		Do.	plus lime	..	..	67	93	95	96
	{	Proprietary X	..	..	..	86	93	95	95
		Do.	plus lime	..	..	94	97	98	98

Referring to the growing tests in soil, the results of which are condensed in Table III., we have here further evidence in support of the view that even the lighter dressing of tar approaches the point of seed injury, not perhaps so much by reducing the number of plants as by weakening their vigour and delaying the appearance of the braird. For instance, twelve days after the sowing of the seeds, the plants in pots 1 and 2 were approximately half an inch high, while those in pots 4, 3, 10 and 9 were only breaking through the soil in that order, and these, in turn, were well above ground before the remaining lots made their appearance. As time went on, however, the differences in the heights of the plants became less noticeable, and when

they were lifted and counted, twenty-eight days after planting, they were all about the same height. While it cannot be denied that all treatments adversely affected the plants to a greater or lesser extent, it would appear that the degree of injury, as judged by delayed braiding, is so small in the case of tar treatment at the rate of one pint per barrel as to be negligible. The beneficial use of lime as a drying agent was not so evident from the growing tests as in the case of laboratory germination tests; nevertheless, there were indications that it did hasten germination to a certain extent wherever it was used.

TABLE III.

Showing the results of growing tests of treated wheat seeds.

Pot No.	Seed Treatments	Order of Braiding	Percentage of plants in 28 days	Order of vigour after 16 days
1	Untreated	1	99	1
2	Dusted with lime	1	98	1
3	Tar { One pint per barrel Do. plus lime Two pints per barrel Do. plus lime Three pints per barrel Do. plus lime	3	96	2
4		2	95	2
5		7	92	3
6		6	94	3
7		9	89	4
8		8	90	4
9	Proprietary X	5	97	2
10	Do. plus lime	4	97	2

At this stage in the investigations the following question suggested itself:—How does the use of lime as a drying agent operate in favour of increasing laboratory germinations?

Though a completely satisfactory answer is not forthcoming, certain pieces of information have been gathered in this connection which are worth recording.

Since dressings at the rate of two pints of tar per barrel were found to have an injurious effect on the germination of wheat seed, several half-pound lots from a bulk of Marquis wheat were dressed at this rate and then treated with lime, fine dry silt, turf ashes, and basic slag as drying agents. The fine silt was prepared by shaking up earth in water and allowing the coarser material to settle. The material in suspension was then decanted off, allowed to settle, and finally collected and dried in a hot-air oven. As the silt became caked on drying it was necessary to crush it in a mortar, when it readily disintegrated into a very fine powder. Germination tests of the treated seeds were then carried out, and the results (which appear in Table IV.) show that, while none of the treatments brought the percentage of germination of the treated seeds up to normal, the use of lime, ashes and silt undoubtedly did improve the germinating energy and the germinating capacity of the tarred seeds, though the same could not be said for basic slag. It was thought that basic slag in large quantities might of itself have an inhibiting effect on seed germination, but repeated trials failed to confirm this view.

TABLE IV.

Showing the effect of various drying agents on the germination of wheat seed treated with tar at the rate of two pints per barrel.

Seed Treatments	PERCENTAGE OF GERMINATION			
	2 days	7 days	10 days	16 days
Untreated	93	98	98	98
Tar only	1	81	85	87
Tar and lime	13	92	95	96
Tar and ashes	11	86	90	93
Tar and silt	10	88	93	95
Tar and basic slag	3	76	84	89

It would appear that we are dealing here with a physical problem, and, further, that certain materials assist in breaking up the film of tar on the surface of the grain, thereby facilitating the absorption of moisture and, in turn, speedy germination. In short, it is suggested that the injurious effect of certain tar treatments on wheat seed results from a physical rather than from a chemical action on the part of the tar, which is primarily inhibitory as distinct from lethal in its effect.

An attempt to settle this matter resolved itself into an effort to supply satisfactory answers to the following queries:—(a) Does the coating of tar on the seed prevent the absorption of moisture by the embryo? (b) Has the tar an injurious chemical action on the embryonic tissues? (c) Does the tar seal the embryo within the seed and prevent its emergence? It was not possible to treat these possibilities as distinct problems and design experiments that would supply the answer to each without reference to the others; nevertheless, a certain line of approach was pursued that seems to leave little doubt as to the identification of the principal factor involved.

From the bulk of Marquis wheat, already referred to in earlier trials, seven lots of two hundred seeds were counted out and subjected to the following treatments and methods of germination:—

1. Seed untreated—Placed irregularly in sand as for normal germination test.
2. Do. Embryo end of seed in sand.
3. Do. Bearded end of seed in sand.
4. Embryo end of each seed coated with tar—Embryo end in sand.
5. Do. do. do. Bearded end in sand.
6. Bearded end of each seed coated with tar—Embryo end in sand.
7. Do. do. do. Bearded end in sand.

In series 4, 5, 6 and 7 the tar was applied to approximately one half of each seed, with a fine camelhair brush, but very little control could be exercised in the actual amounts used. It was estimated, however, from the appearance of the coated seeds in comparison with those from earlier trials where known amounts were used that the rate of application exceeded half a gallon of tar per barrel of seed.

TABLE V.

Showing how the germination of treated and untreated wheat grains is affected by the position of the seeds in the germinating medium.

Lot No.	Seed Treatment	Method of Germination	PERCENTAGE OF GERMINATION				
			3 days	5 days	7 days	10 days	14 days
1	Untreated ..	Normal ..	100	100	100	100	100
2	Do. ..	Embryo end in sand ..	100	100	100	100	100
3	Do. ..	Bearded end in sand ..	0	100	100	100	100
4	Embryo half tarred	Embryo end in sand ..	0	0	25	46	54
5	Do. ..	Bearded end in sand ..	0	0	44	60	80
6	Bearded half tarred	Embryo end in sand ..	100	100	100	100	100
7	Do. ..	Bearded end in sand ..	0	0	96	98	98

For the purpose of compiling Table V., where the results of these trials are shown, the standard for positive germination, especially during the preliminary counts, was taken as the production of a radicle 5 mms. long. Where no germination is recorded in three and five days it does not necessarily follow that some of the seeds were not showing signs of germination at these times, but the absence of positive entries indicates that even in those cases where germination may have begun, the process had not progressed sufficiently far to warrant such records being made, in view of the standard previously fixed.

The first point of note that emerges from the Table referred to is the delay that occurred in germination in the case of Lot 3, where the bearded ends of untreated seeds were embedded in the germinating medium, as compared with Lot 2 where the seeds were placed embryo end down and where germination was rapid and normal. Since the only variable factor here is one of available moisture, this result indicates that in wheat grains the tissues of the seed in the region of the embryo are more permeable to moisture than those at the bearded end.

With regard to the remaining series, it is clear that the application of tar to the embryo ends of the seeds (Lots 4 and 5) reduced both the interim and final germination counts, but where the bearded ends were so treated and the opposite ends planted (Lot 6) no injurious effects followed, which goes to show that the application of tar to the seeds was harmless so long as the embryo ends were not involved. The slow rate of germination of the seeds in Lot 7, as compared with those in Lot 6, is due to the fact that the embryo ends of the former being out of contact with the damp sand, the moisture necessary for germination had to be obtained from the atmosphere within the germinating apparatus, but in the case of Lot 6 the embryo ends of the seeds were actually embedded in the damp sand, from which moisture was freely absorbed and, as a result, germination was rapid.

In no case did those seeds which germinated in Lots 4 and 5, even after ten days, show anything abnormal in their radicles or plumules, which

suggests that no injurious chemical action took place as a result of the tar treatment. By the end of fourteen days all the seeds that had not germinated appeared to be dead, and as moulds were developing on some of them this set of dishes was discarded.

These results were sufficiently interesting to warrant a repetition of the trials, which were slightly modified by the introduction of series 4 (see Table VI.), where untreated wheat seeds were spread on glazed paper, which was placed on the surface of damp sand in a germinating saucer in such a way that the seeds were entirely dependent on the atmosphere as the source of the moisture necessary for their germination.

TABLE VI.

Showing how the germination of treated and untreated wheat grains is affected by the position of the seed in the germinating medium.

Lot No.	Seed Treatments	Method of Germination	PERCENTAGE OF GERMINATION			
			3 days	5 days	7 days	10 days
1	Untreated	Normal	100	100	100	100
2	Do.	Embryo end in sand ..	99	100	100	100
3	Do.	Bearded end in sand ..	0	99	100	100
4	Do.	On glazed paper in sand saucer.	0	100	100	100
5	Embryo half tarred	Embryo end in sand ..	0	8	75	80
6	Do.	Bearded end in sand ..	0	0	62	80
7	Bearded half tarred	Embryo end in sand ..	98	99	99	99
8	Do.	Bearded end in sand ..	0	100	100	100

The results appearing in Tables V. and VI. are strikingly similar, especially when one considers the number of varying factors that are involved, any or all of which might operate against uniformity. On account of this similarity it is unnecessary to discuss these findings further than to point out that the seeds in Lot 4 (Table VI.) were able to absorb sufficient moisture from the atmosphere within the germinating apparatus to enable them to complete the process of germination—a result which explains why the germination of the seeds in Lot 8 was equally satisfactory.

In both sets of experiments a certain number of the seeds which were tarred at the embryo ends failed to germinate even after fourteen days. Some of these showed signs of soft bacterial rots, others became mouldy, but a small percentage remained quite rubbery to the feel. It was thought at first that seeds of the latter type might still be alive and that the emergence of the radicles was prevented by the tough coating of tar acting as a surface seal. Attempts were made, by removing a thin slice of tissue from the

region of the embryo in each case, to facilitate further development, but in no instance did this occur. These seeds were dead, but the cause of death could not be determined.

In this connection the following germination trial is interesting. After the germination tests reported in Table IV. had been made, the surplus seeds that remained were spread in a thin layer on a bench in the working laboratory, where they remained exposed to the air for sixteen days. At the end of this period they were tested for germination, and the results of these tests, which appear in Table VII., show that the air-dried seeds germinated more rapidly than the freshly-treated lots (Table IV.) This trial gives a satisfactory answer to the question of possible chemical injury from the use of tar. Had such injury taken place at the time of application, or within the period that elapsed from the time of application till germination, one would have expected to get figures at least as low as those in Table IV., but, as will be seen, such was not the case. Both the germinating energy and the germinating capacity of the treated seeds improved as a result of the drying. As a possible explanation of this it is suggested that the thin film of tar may have developed cracks on drying which allowed the seed to absorb moisture freely and facilitated the emergence of the developing radicle.

TABLE VII.

Showing the effect of air-drying on the germination of wheat seed treated with tar at the rate of two pints per barrel (see Table IV.)

Seed Treatment	PERCENTAGE OF GERMINATION		
	3 days	7 days	10 days
Untreated	92	97	97
Tar only	65	89	94
Tar and Lime	77	93	98
Tar and Ashes	73	97	98
Tar and Silt	70	96	97
Tar and Basic Slag	50	89	95

As a final trial tar was replaced by paraffin wax. Four lots of seeds were treated by dipping half of each seed into the wax which was kept at a temperature just above melting point but sufficiently low to be harmless to the seeds. Where the embryo ends were treated one hundred seeds were planted with their embryo ends in the germinating medium and another lot of one hundred seeds was planted embryo ends up, a procedure which was repeated where the wax was applied to the bearded half of each seed.

The results which appear in Table VIII. confirm earlier findings with regard to the rate of moisture absorption by different ends of the seeds. Germination was slowed up considerably when the wax was applied to the embryo half of the seeds, but since chemical injury could not arise from the

use of such innocuous material as paraffin wax, its action must be a physical one. The final germination counts for Lots 1 and 2 are greater than those obtained in the case of seeds treated with tar and germinated direct, which may be due to the ease with which the brittle paraffin film was burst by the swelling embryo within the seed and adds further weight to the suggestion that in the case of tar treatments the elasticity of a partially dried tar film is not without significance as a factor inhibiting germination.

TABLE VIII.

Showing the effect of dressings of liquid paraffin wax on the germination of wheat seed.

Lot No.	Seed Treatment, Paraffin Wax	Method of Germination	PERCENTAGE OF GERMINATION			
			2 days	5 days	7 days	10 days
1	Embryo ends coated	Embryo ends in sand ..	0	68	98	98
2	Do. ..	Bearded end in sand ..	0	62	98	98
3	Bearded ends coated	Embryo end in sand ..	0	100	100	100
4	Do. ..	Bearded end in sand ..	98	100	100	100

Though the efficacy of tar as a preventive against bird attack was not of primary importance from the point of view of these investigations, this aspect of the case was not entirely overlooked. Small lots of wheat seeds, both untreated and treated with tar in the manner described in Table II., were spread irregularly on the roof of the Seed Testing Station where city pigeons were in the habit of congregating. The birds soon visited the seeds, and after a few preliminary trials discovered the untreated samples which they quickly consumed. They paid frequent visits to the treated seeds and ate small quantities at each visit, but obviously without any degree of relish. It was clear from their behaviour, however, that they were unable to discriminate between the differently treated lots which they continued to visit until all the seeds were eaten.

The most that can be argued from this isolated trial is that the birds were able to distinguish untreated wheat grains from those dressed with tar or a proprietary preparation, and, had an unlimited supply of untreated grains been available, the treated lots would have been avoided. From this it would appear that dressing wheat seed with commercial tar at the rate of one pint per barrel, makes the grain sufficiently distasteful to birds to encourage them to visit other feeding grounds where more agreeable fare

is provided, which, in practice, are generally neighbouring fields where undressed wheat seed is sown.

The most important points that emerge from these investigations are :—

Tar in certain quantities caused serious injury to wheat seed.

Careful applications of tar at the rate of one pint per barrel of wheat seed did not result in appreciable injury.

Lime, as a drying agent, tended to reduce the possibility of injury to the treated seeds.

Dressings of tar at the rate of one pint per barrel rendered wheat seed distasteful to city pigeons.

The injurious effects of tar arise, in the main, from its physical and not from its chemical action.

FIELD EXPERIMENTS, 1935.

The following report deals with Field Experiments conducted by the County Agricultural Instructors in 1935, which comprised trials with varieties of wheat, oats and potatoes, and manurial tests on wheat and pasture.

The detailed reports in connection with the experiments conducted by the Agricultural Instructors are published in the Annual Reports issued by the different County Committees of Agriculture, and persons who are interested may obtain a copy of the Report for any particular county by applying to the Secretary of the Committee of Agriculture.

WHEAT.

Trials with winter and spring varieties of wheat were conducted.

WINTER WHEAT VARIETY TRIALS.

In the trials with winter varieties, which were conducted at 65 centres in 24 counties, Queen Wilhelmina, Yeoman II., Iron Master, and Steel, were included. Seed of the varieties Queen Wilhelmina, Yeoman II and Iron Master, was produced and distributed by the Albert Agricultural College, Glasnevin. The variety Steel, which has been included in these trials for the first time in the present season, was bred by the Svalöf Plant-Breeding Station, Sweden. Seed of this variety was imported direct from Sweden and distributed by the Albert Agricultural College, Glasnevin.

The trials were laid down at most centres under favourable conditions, and all the varieties germinated and brairded well. Steel, at a few centres, was somewhat backward in early spring but later made good progress, and during summer it compared well with the other varieties at these centres. The weather during spring and early summer was somewhat colder than normal, but all the varieties made good progress. Ripening, which occurred about the same time in all varieties at each centre, set in early. There was little lodging, and the crops were harvested under good conditions.

The varieties Queen Wilhelmina, Iron Master, and Yeoman II have been included in these trials for some years, and the returns in 1935, as in previous years, show that Queen Wilhelmina gave, on the average, better results than either Iron Master or Yeoman II. The Swedish variety Steel gave the highest yield on the average of the four varieties included in the trial. This is a typical winter variety with a creeping habit of growth, long, fairly strong straw, and a large, pale red grain.

Detailed results are given in Table I.

TABLE I.
WINTER WHEAT VARIETY TRIALS.

COUNTY	Date of Sowing	QUEEN WILHELMINA		THOMAS II.		IRON MASTER		STEEL	
		Grain	Straw	Grain	Straw	Grain	Straw	Grain	Straw
Carlow	8/11/34	15 0	38 0	15 0	38 0	15 0	38 0	15 0	38 0
...	23/1/35	23 1	43 0	23 1	43 0	23 1	43 0	23 1	43 0
Cavan	10/11/34	20 2	42 0	21 1	43 0	20 3	40 0	20 0	45 0
...	14/11/34	20 1	35 0	21 1	36 0	21 3	35 0	22 1	35 0
Clare	23/11/34	26 0	44 0	26 0	43 0	26 0	39 0	24 2	38 0
...	22/11/34	18 0	25 0	18 0	25 0	18 0	29 0	20 0	30 0
Cork	10/11/34	20 0	38 0	20 0	36 0	20 0	32 0	20 0	36 0
...	12/11/34	22 2	42 3	22 2	42 3	22 2	37 0	22 2	42 3
"	22/10/34	22 2	42 3	22 2	42 3	22 2	37 0	22 2	42 3
"	22/11/34	22 2	39 0	22 2	39 0	22 2	32 0	22 2	39 0
"	10/11/34	24 2	39 0	24 2	39 0	24 2	32 0	24 2	39 0
"	24/1/35	24 1	26 2	24 1	26 2	24 1	34 0	24 0	40 0
"	20/11/34	23 1	37 0	23 1	38 0	23 1	34 0	23 0	42 0
"	8/12/34	24 0	37 0	24 0	44 0	22 2	33 0	20 0	48 0
"	9/11/34	17 0	34 0	17 0	36 0	17 0	36 0	17 0	38 0
Dublin	26/10/34	34 0	51 0	34 0	51 0	34 0	51 0	34 0	51 0
...	14/11/34	21 1	35 0	21 1	35 0	21 1	35 0	21 1	35 0
Galway	23/11/34	21 1	35 0	21 1	35 0	21 1	35 0	21 1	35 0
...	20/11/34	20 1	35 0	20 1	35 0	20 1	35 0	20 1	35 0
"	12/11/34	20 1	35 0	20 1	35 0	20 1	35 0	20 1	35 0
"	14/11/34	20 1	35 0	20 1	35 0	20 1	35 0	20 1	35 0
Kerry	22/1/35	39 0	51 0	39 0	51 0	39 0	51 0	39 0	51 0
...	5/2/35	35 0	51 0	35 0	51 0	35 0	51 0	35 0	51 0
Kildare	31/10/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
...	6/11/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
Kilkenny	2/11/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
Laoghaigh	23/11/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
...	12/11/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
Leitrim	13/11/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
"	17/11/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
"	17/11/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
Limerick	22/10/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
...	19/10/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
"	5/12/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
"	24/11/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
Longford	24/11/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
...	24/11/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
Louth	24/11/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
...	15/11/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
Mayo	13/12/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
...	21/11/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
"	22/11/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
"	22/11/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
Meath	22/11/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
Monaghan	26/10/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
...	5/11/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
Offaly	22/10/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
...	12/11/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
Roscommon	22/11/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
...	22/11/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
"	4/3/35	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
"	4/3/35	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
Sligo	27/11/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
...	7/12/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
Tipperary	14/11/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
...	22/11/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
"	27/12/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
"	15/10/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
Westmeath	16/11/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
...	6/11/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
Wexford	19/10/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
Wicklow	20/10/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
...	26/11/34	26 0	44 0	26 0	44 0	26 0	44 0	26 0	44 0
Averages	—	24 3	40 3	22 3	37 2	24 0	40 0	26 0	41 1
	(Centres)	(65)	(50)	(61)	(58)	(65)	(59)	(61)	(57)

SPRING WHEAT VARIETY TRIALS.

Tests with four varieties of spring wheat were conducted at 54 centres in 22 counties, the following varieties being grown, April Red, Mansholt's Van Hoek, Diamant, and Marquis. April Red has been grown in this country for a number of years and is too widely known to require description. Mansholt's Van Hoek is a Dutch variety with a semi-erect habit of growth, strong straw, and a large coarse grain of very pale red colour. Diamant, a Swedish variety, is a typical spring wheat with an erect habit of growth and a large plump grain of a deep red colour. Marquis is a Canadian variety with an erect habit of growth, short straw, and a small grain of a light red colour.

The seed of all the varieties under trial was distributed by the Albert Agricultural College, Glasnevin. The varieties were sown at practically all the centres between the 20th and 31st of March. With a few exceptions all varieties were unaffected by the cold weather during spring and early summer. There was no appearance of disease during the trials, with the exception of yellow stripe rust, which attacked the variety Marquis rather badly at 12 centres and the variety Diamant equally badly at 8 centres. Apart from April Red, which was inclined to lodge in some of the wetter districts, all the varieties resisted lodging well, Mansholt's Van Hoek being particularly good in this respect.

Marquis ripened earliest, on the average, Diamant and April Red being a few days later. Mansholt's Van Hoek ripened generally from 10 to 14 days later than Marquis. April Red gave the highest average yield of the varieties in the trial, followed closely by Mansholt's Van Hoek. Diamant on the average gave a satisfactory yield, but not as good as Mansholt's Van Hoek. Marquis gave very variable returns, producing relatively high yields at a limited number of centres, and poor returns at a number of other centres. In general, the best results from this variety were obtained when it was sown on rich heavy soils.

Detailed results are given in Table II.

TABLE II.
SPRING WHEAT VARIETY TRIALS, 1935.

COUNTY	VARIETIES			
	April Red	Mansholt's Van Hoek	Diamant	Marquis
	c. q.	c. q.	c. q.	c. q.
Carlow	17 2	19 1	16 2	14 1
Cavan	23 3	30 0	22 2	20 1
Clare	20 0	24 1	21 2	20 0
"	26 2	23 0	21 2	25 3
Cork	30 1	30 2	36 0	30 3
"	21 1	15 3	18 3	14 3
"	20 1	20 3	20 3	14 2
"	16 1	—	—	10 1
"	25 3	31 1	32 2	28 0
"	30 0	18 3	28 3	25 0
"	24 0	23 2	20 0	17 0
"	11 3	21 3	16 1	14 2
"	19 3	10 0	22 2	20 1
"	27 2	20 3	29 2	22 0
Dublin	31 1	29 2	27 3	22 2
"	30 3	38 0	31 2	32 2
Galway	17 1	21 2	18 0	17 3
"	17 3	22 1	19 1	17 2
Kerry	28 0	31 3	29 2	24 3
"	20 2	—	20 1	15 2
Kildare	16 0	15 2	14 3	10 0
"	15 3	16 2	13 1	12 2
Laoighis	25 3	25 0	8 2	7 3
"	24 2	22 2	17 1	17 3
Leitrim	20 3	17 1	18 0	16 2
"	20 1	16 0	19 2	16 2
Limerick	26 0	30 0	26 0	26 0
"	22 2	23 3	26 0	22 2
"	25 3	20 0	22 3	17 2
Longford	25 1	24 1	22 0	27 0
Louth	28 0	29 0	24 0	20 2
"	34 0	33 2	23 2	19 0
Mayo	18 3	17 0	18 2	17 3
"	18 2	17 0	18 0	17 3
"	19 0	21 2	20 2	18 3
"	18 0	20 0	19 2	18 1
Meath	23 1	16 2	20 1	17 2
Monaghan	23 1	15 0	15 0	10 0
Offaly	22 1	27 0	25 1	18 0
"	28 1	30 0	28 3	22 0
Roscommon	21 2	21 3	19 2	19 3
"	19 2	19 3	18 2	18 1
"	23 0	23 2	21 0	20 0
"	13 0	10 0	12 2	12 0
Sligo	19 1	22 2	20 1	19 0
"	20 2	23 1	17 2	20 0
Tipperary	28 1	24 3	26 0	20 3
"	24 2	25 2	20 1	24 0
"	19 0	22 0	16 3	18 2
"	21 0	21 0	18 0	20 0
Westmeath	16 0	14 2	10 1	8 3
"	22 2	12 3	13 2	10 1
Wicklow	22 3	17 1	20 3	17 0
"	18 2	20 0	15 2	14 1
Average Yield ..	22 2	22 0	20 3	18 2
Centres	(54)	(52)	(53)	(54)

WHEAT MANURIAL TRIALS.

During the 1934-35 season, manurial tests were conducted with winter wheat, the following three trials being carried out :—

Trial No. 1.

This trial was conducted with the object of determining the influence of a dressing of artificial manures on wheat grown on the lighter soils which, under ordinary circumstances, would not be considered typical wheat soils. Two plots were laid down at each centre :—

Plot (a). Control—unmanured.

Plot (b). Dressed at the rate of 3 cwt. superphosphate and 2 cwt. kainit (14 per cent. potash) per statute acre at the time of sowing, and 1 cwt. sulphate of ammonia per statute acre applied in spring at the discretion of the Instructor.

The trial was conducted at 39 centres in 17 counties, and the manured plots returned on the average almost 5 cwt. more grain and over 6 cwt. more straw per statute acre than the unmanured plots.

The results, which are set out in detail in Table III, show that at practically all centres the manurial dressing produced an increased yield, and that at the majority of the centres the increase was considerable. These results would go to show that on the lighter types of soil, the application of artificial manures will give a substantial economic return.

TABLE III.

COUNTY	PLOT A.—CONTROL		PLOT B.—MANURED	
	Grain	Straw	Grain	Straw
	c. q.	c.	c. q.	c.
Cavan	17 3	28	25 2	40
Clare	18 2	30	18 2	32
"	20 0	27	21 2	30
Cork	24 0	43	26 2	44
"	18 1	28	21 3	30
"	21 1	41	24 2	46
"	29 0	36	30 1	37
"	13 0	27	26 3	43
"	18 2	32	28 0	46
"	31 3	38	33 0	45
"	24 0	38	36 0	42
"	20 3	36	24 1	38
"	20 2	27	21 2	31
"	23 3	—	30 0	—
Dublin	12 3	28	22 3	40
Kerry	14 2	24	20 3	34
Kildare	14 3	27	21 2	39
"	16 1	26	24 0	38
Laoighis	28 0	—	33 2	—
"	18 1	33	20 2	25
"	26 1	—	31 2	—
Limerick	20 0	67	23 0	75
"	25 2	64	33 3	74
Lengford	16 1	39	20 2	34
Meath	16 2	—	21 3	—
"	18 3	—	25 1	—
Mayo	18 2	36	21 3	38
"	14 0	29	18 1	35
Offaly	21 3	36	25 2	39
Roscommon	21 2	38	25 3	41
"	24 2	36	25 3	40
"	12 1	—	20 2	—
"	10 3	—	17 0	—
Sligo	23 3	48	28 2	51
"	23 1	41	26 1	44
Tipperary (N.R.)	15 1	—	19 2	—
Westmeath	9 0	20	16 3	34
Wicklow	15 0	30	19 2	35
"	24 3	36	28 2	39
Average yield ..	19 2	35	24 1	41 0
No. of Centres ..	(39)	(31)	(39)	(31)

Trial No. 2.

This trial was conducted with the object of determining the effect on yield and time of ripening, of artificial nitrogenous manures, applied to the wheat crop at monthly intervals from the middle of March to the middle of May. Three plots were laid down at each centre and treated as follows :—

Plot (a). Dressed with sulphate of ammonia at the rate of 1 cwt. per statute acre, about the middle of March.

Plot (b). Dressed with sulphate of ammonia at the rate of 1 cwt. per statute acre, about the middle of April.

Plot (c). Dressed with sulphate of ammonia at the rate of 1 cwt. per statute acre, about the middle of May.

The first dressing had the effect of improving the appearance of the crops to which it was applied. The second and subsequent dressings did not appear so effective in this respect. Except at two centres, the crop on all three plots ripened at the same time and, on the average, equal yields of grain were obtained from all plots.

Detailed results are given in Table No. IV.

TABLE IV.

COUNTY	PLOT A. 1 cwt. Sulphate of Ammonia applied middle of March		PLOT B. 1 cwt. Sulphate of Ammonia applied middle of April		PLOT C. 1 cwt. Sulphate of Ammonia applied middle of May	
	Grain	Straw	Grain	Straw	Grain	Straw
	c. q.	c.	c. q.	c.	c. q.	c.
Cavan ..	17 0	35	17 1	35	20 2	35
" ..	14 1	35	13 2	32	16 3	30
Clare ..	18 2	30	18 2	31	18 0	30
Cork ..	18 3	60	20 0	61	18 3	60
" ..	24 0	46	28 1	44	26 0	40
" ..	30 1	58	28 1	50	30 0	54
" ..	19 1	27	20 1	28	22 2	32
" ..	21 2	36	20 0	34	19 0	30
" ..	12 2	46	15 2	35	13 0	26
" ..	21 1	32	22 1	32	22 1	33
" ..	16 1	33	18 2	36	23 0	39
" ..	29 1	46	29 1	45	29 1	43
" ..	23 0	42	25 3	45	20 3	45
" ..	31 0	45	31 1	41	32 0	42
" ..	18 2	25	19 3	29	18 2	24
" ..	28 2	41	30 2	46	28 0	49
Kerry ..	32 0	53	29 3	59	30 2	49
Kildare ..	26 2	54	23 3	47	24 1	40
" ..	23 2	46	21 1	43	20 0	41
Laoighis ..	21 0	29	24 1	28	26 0	26
" ..	18 0	—	19 1	—	22 3	—
" ..	25 1	—	26 0	—	26 0	—
" ..	18 3	—	19 1	—	21 3	—
Leitrim ..	28 2	38	27 0	39	26 1	38
Limerick ..	26 0	80	23 0	63	21 2	60
" ..	32 0	60	35 0	60	31 1	58
Longford ..	20 1	46	23 1	48	24 2	49
Meath ..	27 2	30	28 3	30	30 1	31
" ..	22 3	24	24 2	26	28 1	30
Mayo ..	22 2	38	22 0	38	21 3	38
" ..	24 2	40	24 0	40	24 1	40
Offaly ..	30 0	37	30 1	38	29 1	40
" ..	18 2	33	20 0	34	19 0	32
Roscommon ..	24 3	—	23 2	—	23 3	—
" ..	22 1	—	21 2	—	21 1	—
" ..	22 2	42	21 3	41	21 1	38
" ..	24 2	40	24 2	38	22 0	38
Sligo ..	32 2	55	31 3	53	28 0	49
Tipperary ..	28 0	—	26 2	—	26 2	—
" ..	22 2	—	22 0	—	21 2	—
" ..	31 1	50	29 3	46	29 1	44
Westmeath ..	25 2	32	25 0	30	23 3	30
" ..	18 3	25	16 2	24	19 1	25
Wicklow ..	29 1	45	23 3	42	23 0	40
" ..	20 1	40	19 2	36	20 2	35
" ..	16 0	38	16 1	35	14 3	33
Average Yields ..	23 2	41 1	23 2	40 0	23 2	38 3
No. of Centres ..	(46)	(39)	(46)	(39)	(46)	(39)

Trial No. 3.

This trial was conducted to test the effect of an application, at the time of sowing of superphosphate and kainit, to lea wheat. No nitrogenous manure was applied in this trial. Two plots were laid down at each centre.

Plot (a). Control without manure.

Plot (b). Dressed at the rate of 3 cwt. superphosphate and 2 cwt. kainit (14 per cent. potash) per statute acre.

The trial was conducted at 32 centres in 15 counties. Apart from two centres where the wheat was sown on very rich land, all the plots benefited considerably by the application of artificial manures. The returns, which are given in detail in Table V, show that, on the average, an increase in yield of over 5 cwts. of grain and 5 cwts. of straw was obtained as a result of the application of manures.

The results of this experiment clearly indicate that the application of a dressing of artificial manures composed of a mixture of superphosphate and kainit to wheat grown on lea land is productive of good results, even where the soil is of average fertility, and that on the poorer types of soil remarkable increases in yield can be secured.

TABLE V.

COUNTY	PLOT A.—CONTROL		PLOT B.—MANURED	
	Grain	Straw	Grain	Straw
	c. q.	c.	c. q.	c.
Cavan	6 3	25	9 3	28
Clare	22 3	—	28 2	—
"	10 0	24	18 2	32
Cork	16 3	44	13 2	49
"	26 3	39	30 0	44
"	12 0	27	17 0	33
"	18 2	32	27 1	46
"	12 0	27	18 1	29
"	14 3	26	20 3	30
"	20 2	35	24 3	36
Kerry	14 2	24	20 2	30
Kildare	17 2	36	30 0	51
"	18 3	34	28 1	44
"	15 3	30	24 0	42
"	11 0	22	16 1	30
Laoighis	24 1	32	27 1	33
"	20 0	27	23 3	29
"	23 1	—	29 2	—
Limerick	30 0	63	30 3	70
Longford	20 0	35	26 1	37
Meath	20 2	—	27 1	—
Offaly	21 0	31	22 2	34
Roscommon	20 0	34	22 3	38
"	9 3	—	19 3	—
"	7 3	—	15 1	—
Sligo	22 3	45	26 3	49
"	17 3	33	20 1	35
Tipperary S.R.	23 3	39	28 0	44
Westmeath	28 3	42	33 3	46
"	17 0	28	18 0	28
Wicklow	23 0	38	29 3	42
"	18 1	35	22 2	38
Average Yield ..	18 1	33 3	23 2	38 3
No. of Centres ..	(32)	(27)	(32)	(27)

OAT VARIETY TRIALS.

Two series of trials were conducted.

(a) Trials in which Victory II, Ardri and Glasnevin Success III were included.

(b) Trials with Glasnevin Sonas, Sonas Marvellous, and Ardri.

The first series of trials was confined to the medium and lighter soils, while the second series was conducted on the heavier types of soils where oats are liable to lodge. The seed in all cases was obtained from the Albert Agricultural College, Glasnevin.

Particulars of the centres where the trials were conducted, and of yields obtained in both series, are set out in Tables VI and VII.

TABLE VI.
OAT VARIETY TRIALS.

COUNTY	VICTORY II.		ARDRI		GLASNEVIN SUCCESS III.	
	Grain	Straw	Grain	Straw	Grain	Straw
	c. q.	c.	c. q.	c.	c. q.	c.
Cavan ..	32 1	40	35 1	35	37 0	34
" ..	23 0	33	25 3	40	24 1	35
Clare ..	21 2	36	22 1	31	24 1	32
Cork ..	25 3	56	27 0	59	29 3	63
" ..	32 2	44	34 3	46	27 0	48
" ..	31 1	36	35 2	43	31 0	44
" ..	35 1	52	39 1	54	36 0	40
" ..	29 1	46	29 2	43	32 1	45
" ..	20 1	38	22 1	37	21 1	33
" ..	26 2	36	23 1	40	29 2	34
" ..	23 0	35	26 2	41	21 2	30
" ..	34 0	39	33 0	41	32 3	36
" ..	31 0	42	36 2	49	34 3	42
Galway ..	22 1	34	23 3	30	21 2	30
" ..	20 2	32	21 2	29	20 1	28
Kerry ..	25 1	43	30 1	47	33 2	41
" ..	29 0	43	26 3	41	25 2	36
Laoighis ..	21 0	35	27 2	31	31 3	27
" ..	17 0	—	17 3	—	17 3	—
Louth ..	31 0	37	29 2	35	32 0	40
" ..	29 0	—	29 1	—	30 0	—
Longford ..	23 2	23	24 3	28	23 2	28
" ..	25 2	29	23 1	29	26 0	30
Mayo ..	21 3	33	24 1	39	22 3	33
" ..	21 0	37	23 2	38	22 2	37
" ..	26 1	42	26 1	40	25 0	36
" ..	21 0	36	23 2	35	25 1	33
Monaghan ..	24 0	29	21 0	26	22 2	27
" ..	20 2	28	22 0	29	21 1	29
Offaly ..	16 3	32	18 2	36	15 1	31
Sligo ..	26 2	50	23 1	44	22 2	38
" ..	27 2	45	26 2	50	30 1	40
Tipperary ..	31 2	44	23 0	32	32 0	40
" ..	28 0	—	24 2	—	26 0	—
Wexford ..	29 0	41	38 2	54	36 1	49
" ..	31 2	44	33 2	48	32 0	48
Wicklow ..	18 0	35	19 1	35	20 1	33
" ..	18 2	34	19 1	34	20 0	32
Averages (Grain 38 Centres) (Straw 35 ..)	25 2	38 3	26 3	39 1	26 3	36 3

POTATO VARIETY TRIALS, 1935.

VARIETIES.

COUNTY	ARRAN CAIRN				KERR'S PINK				ARRAN BANNER			
	Ware	Small	Diseased	Total	Ware	Small	Diseased	Total	Ware	Small	Diseased	Total
	t. c. q.	t. c. q.	t. c. q.	t. c. q.	t. c. q.	t. c. q.	t. c. q.	t. c. q.	t. c. q.	t. c. q.	t. c. q.	t. c. q.
Carlow	19 14 0	1 0 1	—	20 14 1	12 17 0	1 14 2	—	14 11 2	—	—	—	—
Cavan	12 3 2	0 8 0	0 10 2	13 2 0	11 8 2	0 15 2	0 5 1	12 9 1	13 2 0	0 4 0	1 2 0	14 8 0
Clare	15 4 0	0 4 0	0 12 1	16 0 1	11 10 1	1 2 1	0 10 3	13 3 1	14 15 3	0 8 0	1 5 0	16 8 3
	6 5 3	2 5 3	0 7 0	8 18 2	—	—	—	—	7 0 0	1 8 2	0 7 0	8 15 2
"	13 14 1	2 15 0	0 5 2	16 14 3	—	—	—	—	9 6 2	1 10 0	1 0 0	11 16 2
"	11 3 2	1 15 2	0 10 0	13 9 0	15 5 2	1 5 0	0 15 0	17 5 2	—	—	—	—
"	8 14 0	1 11 0	0 13 0	10 18 0	9 7 0	1 10 0	0 15 0	11 12 0	—	—	—	—
Cork	20 6 0	0 17 1	—	21 3 1	11 14 0	0 17 0	0 11 0	13 2 0	12 11 2	0 5 3	0 11 1	13 8 2
"	15 14 0	2 0 0	—	17 14 0	13 14 0	0 17 0	1 8 2	15 19 2	14 11 2	0 11 0	2 11 2	17 14 0
"	14 11 2	0 17 0	—	15 8 2	12 0 0	2 6 0	—	14 6 0	10 0 0	1 8 2	—	11 8 2
"	10 17 0	0 17 0	—	11 14 0	8 17 0	1 14 1	—	10 11 1	10 6 0	0 6 0	—	10 12 0
"	11 14 1	1 5 2	0 3 0	13 2 3	13 3 0	1 10 1	0 4 0	14 17 1	17 14 1	1 7 2	0 1 0	19 2 3
"	8 0 0	1 3 3	0 2 0	0 5 3	15 0 0	3 5 2	0 3 0	13 8 2	15 11 1	2 10 1	0 1 0	18 2 2
"	7 0 0	2 0 0	—	0 0 0	14 3 0	2 0 0	0 3 0	16 6 0	15 11 1	1 0 0	—	16 11 1
"	10 11 1	2 17 2	0 2 2	13 11 1	16 5 2	3 3 0	0 5 3	19 14 1	—	—	—	—
"	16 5 3	0 15 0	0 2 0	17 2 3	15 5 3	0 4 0	0 2 2	15 12 1	20 5 3	0 9 0	0 2 2	20 17 1
"	12 17 0	1 10 0	0 5 3	14 12 3	14 0 0	1 7 1	0 17 1	16 4 2	12 5 3	0 18 2	1 1 2	14 5 3
"	10 4 1	1 8 2	0 2 0	11 14 3	—	—	—	—	7 5 3	0 17 1	0 1 0	8 4 0
"	15 0 0	1 5 3	0 4 1	16 10 0	15 5 3	1 0 0	0 4 1	16 10 0	17 1 2	4 8 2	1 12 3	23 2 8
"	15 2 3	2 16 1	0 5 2	18 4 2	10 1 2	1 11 2	0 11 2	12 4 2	12 4 1	1 14 1	0 18 2	14 17 0
"	10 5 3	0 7 1	0 4 1	10 17 1	7 2 3	1 17 0	0 5 1	9 5 0	8 15 3	1 0 0	0 4 1	10 0 6
"	14 3 2	3 10 0	0 4 3	17 13 1	15 13 1	4 4 1	0 2 2	20 0 0	15 17 2	3 10 1	0 4 3	19 12 2
"	14 13 1	1 4 1	0 2 0	15 19 2	12 5 2	3 13 0	0 5 3	16 4 1	13 11 2	1 16 2	0 2 1	15 10 1
Donegal	17 17 0	0 14 1	0 5 3	18 17 0	14 14 1	0 11 2	0 2 3	15 8 2	—	—	—	—
"	14 17 0	0 5 3	0 14 1	15 17 0	14 4 2	0 7 0	0 7 0	14 18 2	—	—	—	—
Dublin	13 13 0	3 17 0	—	13 5 2	3 15 3	5 13 0	—	9 8 3	7 14 1	2 10 0	—	10 4 1
"	15 13 0	3 4 1	0 11 1	16 9 0	5 16 1	4 8 1	0 1 1	10 5 3	8 2 1	2 13 0	0 16 1	11 11 2
Kerry	15 13 0	1 0 0	0 3 0	13 16 0	11 14 0	1 6 0	0 6 0	13 6 0	18 3 0	0 11 2	0 10 0	17 4 2
Kildare	12 8 3	1 2 1	—	14 5 0	12 4 0	1 0 0	0 11 2	13 15 2	14 8 0	0 13 0	0 8 2	15 7 2
Longford	12 12 2	3 6 1	0 6 2	13 11 0	9 6 2	1 9 1	0 1 3	10 17 2	9 12 3	1 3 2	0 2 1	10 18 2
"	11 3 0	1 15 0	—	12 18 0	—	—	—	—	—	—	—	—
"	17 11 0	2 3 0	—	19 14 0	—	—	—	—	—	—	—	—
"	7 3 0	2 17 0	—	10 3 0	—	—	—	—	—	—	—	—
Lettin	8 12 0	2 4 1	0 5 0	11 1 1	10 2 1	1 18 0	0 6 2	12 6 3	—	—	—	—
Limerick	13 0 0	1 0 0	0 3 0	14 3 0	7 5 0	1 15 0	1 3 0	10 3 0	11 10 0	1 10 0	0 5 0	13 5 0
"	11 15 0	0 15 0	0 3 0	12 13 0	9 10 0	1 5 0	0 5 0	11 0 0	—	—	—	—
"	11 2 0	1 5 0	0 10 0	12 17 0	9 10 0	2 0 0	2 10 0	14 0 0	12 3 0	1 6 0	1 5 0	14 14 0
"	10 15 3	1 3 0	0 12 0	12 10 3	10 5 0	2 2 3	3 1 2	15 9 1	11 15 0	2 0 0	2 4 3	15 19 3
Longford	17 8 0	2 15 0	1 4 0	21 7 0	12 2 0	1 2 0	0 6 0	13 10 0	17 6 0	0 13 0	0 6 0	18 5 0
"	18 4 0	1 1 0	0 10 0	19 15 0	11 2 0	1 1 0	0 7 0	12 10 0	19 5 0	0 18 0	0 7 0	20 10 0
Louth	14 11 0	0 17 2	0 1 3	15 10 1	12 17 0	—	—	14 19 0	13 10 0	1 8 0	0 16 0	15 14 0
"	13 12 0	2 4 0	—	15 16 0	8 14 0	3 0 0	0 2 2	11 16 2	9 10 0	2 15 2	0 5 2	12 11 0
Mayo	11 8 2	0 17 0	2 9 2	14 15 0	—	—	—	—	13 18 0	0 18 2	1 0 2	15 17 0
"	12 12 1	0 16 2	—	13 8 3	—	—	—	—	12 14 0	0 19 2	—	13 13 2
"	10 0 2	1 3 0	0 5 2	11 0 0	9 0 0	1 2 2	0 3 0	10 5 2	—	—	—	—
"	9 10 0	1 0 2	0 4 3	10 15 1	9 2 0	1 0 2	0 4 0	10 6 2	—	—	—	—
Meath	9 0 0	0 10 1	0 0 2	9 10 8	10 4 0	0 9 0	0 2 0	10 15 0	9 11 0	0 6 0	0 1 0	9 18 0
Monaghan	15 14 1	0 15 3	0 11 2	17 1 2	11 14 1	1 1 2	0 17 0	13 12 3	12 14 1	1 0 0	1 0 0	14 14 1
"	14 0 1	0 10 2	0 7 2	14 18 1	18 14 1	1 0 0	—	20 12 3	16 18 0	0 12 0	1 11 2	19 1 2
Offaly	9 12 0	1 0 0	—	10 12 0	—	—	—	—	9 15 0	1 0 0	—	10 15 0
"	9 18 0	1 8 0	—	11 6 0	—	—	—	—	7 15 0	1 12 0	0 7 0	9 14 0
Roscommon	15 11 1	0 18 2	1 3 2	17 13 1	11 13 1	1 14 0	2 14 0	16 1 1	13 5 2	1 0 2	2 3 0	16 9 0
"	13 16 1	0 11 3	0 9 1	14 17 1	9 15 3	1 5 0	1 11 1	12 12 0	11 0 2	0 19 1	1 2 0	13 1 3
"	14 2 2	1 2 0	—	15 4 2	8 6 2	2 2 0	0 18 0	11 6 2	14 6 0	1 10 2	0 3 0	15 19 2
"	14 2 0	1 0 0	—	15 2 0	10 2 0	0 16 2	0 12 0	11 10 2	12 2 2	0 18 0	0 4 0	13 4 2
"	10 2 0	0 12 2	—	16 14 2	—	—	—	—	15 3 0	1 6 0	0 2 0	16 11 0
Sligo	12 11 2	1 5 1	0 4 3	14 1 2	11 14 0	1 14 0	0 6 0	13 14 0	13 2 0	1 2 0	0 5 0	14 9 0
Tipperary	16 0 0	1 10 0	—	17 10 0	16 10 0	1 15 0	—	18 5 0	19 0 0	1 0 0	—	20 0 0
"	9 15 2	1 5 0	—	14 1 2	10 2 0	1 15 0	2 0 0	13 17 0	12 8 0	1 8 2	1 15 2	15 10 0
"	15 16 0	1 0 0	—	18 0 0	12 10 0	2 0 0	—	14 10 0	14 10 0	0 18 0	—	15 8 0
"	16 5 0	0 15 2	—	16 11 2	15 0 0	1 0 0	—	16 0 0	14 10 0	0 15 0	—	15 15 0
"	17 10 2	1 19 2	—	19 10 0	16 15 0	1 0 0	—	12 10 0	13 0 0	0 15 0	—	13 15 0
"	14 15 0	1 0 0	—	15 15 0	12 0 0	2 0 0	0 10 0	13 5 0	21 0 0	1 9 2	1 0 0	23 9 2
"	13 5 0	0 19 0	—	19 4 0	15 0 0	1 5 0	—	16 0 0	12 11 0	0 9 0	—	13 0 0
"	6 10 0	1 10 0	—	17 0 0	18 0 0	1 4 0	—	19 0 0	16 0 0	0 15 0	0 5 0	17 0 0
"	15 10 0	1 10 0	—	17 0 0	18 0 0	1 5 0	—	14 5 0	6 12 0	1 6 0	—	7 18 0
Westmeath	12 0 0	2 0 0	—	14 0 0	10 10 0	3 0 0	—	13 10 0	14 0 0	2 0 0	—	15 0 0
"	14 6 0	0 5 0	—	14 11 0	14 0 0	0 6 0	—	14 6 0	—	—	—	—
"	17 0 0	0 3 0	—	17 3 0	12 2 0	0 11 0	0 1 0	12 14 0	16 3 0	0 4 0	—	16 7 0
Wicklow	19 13 1	1 8 1	—	21 1 2	15 8 3	1 3 2	0 12 1	17 4 2	19 0 2	1 5 2	—	20 6 0
"	17 14 1	1 16 2	0 5 1	19 16 0	14 5 0	1 18 3	0 8 2	16 12 1	17 14 0	1 17 0	0 8 1	19 19 1
"	14 15 2	1 3 0	—	15 18 2	11 19 0	1 4 2	0 11 1	13 14 3	12 12 2	1 5 3	—	13 18 1
"	11 10 0	1 2 0	0 8 3	13 0 3	9 11 1	1 6 2	1 12 0	12 9 3	12 6 0	0 19 2	0 9 2	13 15 0
Average	13 7 2	1 7 1	0 5 2	15 0 1	11 17 3	1 12 3	0 9 3	14 0 1	13 6 0	1 4 3	0 10 1	15 1 0
No. of Centres	75				63				66			

TABLE VII.
OAT VARIETY TRIALS, 1935.

COUNTY	GLASNEVIN SONAS		SONAS MARVELLOUS		ARDRI	
	Grain	Straw	Grain	Straw	Grain	Straw
	c. q.	c.	c. q.	c.	c. q.	c.
Dublin ..	30 0	—	32 3	—	28 3	—
" ..	32 1	35	33 0	36	31 1	30
Kildare ..	22 0	31	23 2	33	25 2	34
" ..	21 2	29	22 3	35	22 2	35
Limerick ..	40 0	50	32 2	48	36 2	50
" ..	36 0	32	30 3	31	28 0	31
" ..	27 2	48	32 2	53	35 0	55
" ..	27 1	52	25 3	58	35 0	60
Meath ..	27 1	—	22 3	—	22 0	—
Roscommon ..	25 0	35	24 2	32	24 2	32
" ..	22 0	30	22 0	30	21 2	28
" ..	24 3	—	23 3	—	26 0	—
" ..	26 0	—	26 1	—	27 1	—
Tipperary ..	30 2	39	24 2	34	21 2	31
" ..	27 0	37	24 3	35	24 0	34
Westmeath ..	21 2	48	28 3	42	23 2	46
" ..	35 0	48	34 2	49	32 0	49
Averages ..	28 0	39 2	27 1	39 3	27 1	39 2
(Grain 17 Centres)						
(Straw 13 ")						

In the first series of trials, Ardri and Glasnevin Success III produced, on the average, the same quantity of grain, and both varieties gave better yields than Victory II. All the varieties stood up well, and there was no lodging except in the case of Victory II at one centre, and Ardri at another. Glasnevin Success III generally ripened about 4 to 7 days before Victory II and Ardri, both of which ripened about the same time.

In the second series, Glasnevin Sonas produced a slightly better yield of grain on the average than either Sonas Marvellous or Ardri. Both the latter varieties yielded equally well. Except at 3 centres where all three varieties lodged to the same extent, the varieties stood up well.

POTATO VARIETY TRIALS.

These trials, which were laid down at 75 centres in 22 counties, were designed to ascertain how the comparatively new maincrop variety, Arran Cairn, compared in yield with the well-known maincrop varieties grown in each district. At the majority of centres Arran Cairn was tested against Kerr's Pink and Arran Banner. The results set out in Table VIII show that Arran Banner and Arran Cairn gave approximately the same yield of marketable potatoes, and that both gave a better yield than Kerr's Pink.

Arran Cairn is an immune, kidney shaped variety, with a white skin, white flesh, shallow eyes, a pink sprout, flowers of a dark red purple with large white tips, and red purple buds. The foliage is tall, vigorous and upright, but spreading later, and the leaflets are a medium dull green colour.

MANURIAL TRIALS WITH CLARE PHOSPHATE AND NORTH AFRICAN MINERAL PHOSPHATE.

In 1933 a series of pasture manurial experiments was laid down mainly on peaty soils, with the object of comparing Clare phosphate from a new seam with North African Mineral phosphate as a source of phosphates for top-dressing pastures. The Clare phosphate was applied at the rate of 10 cwt. per statute acre, and the North African Mineral phosphate at the rate of 8 cwt. per statute acre, at 138 centres.

The plots were kept under observation during 1933 and 1934, and the results noted were published in the Department's Journal, Volume XXXIII, Nos. 1 and 2.

During the season 1935, these plots were again kept under observation, and reports on the appearance of the plots during the year and up to the close of the grazing period, were received from 112 centres (the plots at the remaining 26 centres having been ploughed up). At 98 of these centres the North African Mineral phosphate produced a considerable improvement in the quality and quantity of the herbage. In practically every case the increase of clovers and finer grasses was a striking feature. At 10 other centres the improvement was described as fair, and at 3 of the 4 remaining centres a slight improvement was noticeable, whilst at one centre no change in the appearance of the plot was noticeable.

Of the plots dressed with Clare phosphate, a considerable improvement in the quality and quantity of the herbage—quite equal to that produced by the North African Mineral phosphate—was reported from 13 centres. At 21 other centres a fair improvement in the general appearance of the pasture was noted. At 31 additional centres only a slight improvement in the appearance of the pasture, as compared with the control plots, was reported. There was no evidence of improvement in the plots dressed with Clare phosphate as compared with the controls at the remaining 47 centres.

FINAL FRUIT CROP REPORT, 1935.

WEATHER.

The weather in 1935 was unfavourable, on the whole, for the fruit crop. The spring began well with abundant bloom on all classes of fruit trees. Apples (with the exception of Bramley's Seedling), Plums, Damsons, Pears, and Cherries were all very promising, but the severe cold rain and hail storms during the flowering period caused a heavy shedding of flowers before the fruit had set. In the northern and eastern districts many of the small fruits which had set were completely destroyed by the frost and hail storm of mid-April and mid-May. From May onwards, the weather was favourable until mid-September, but very severe storms in most districts on the 14th to 17th September caused much damage, particularly to the apple crop.

In Carlow the first part of the year was very unfavourable, but March, April and May were dry in general.

In Clare, Limerick and Kerry, the weather was very severe, especially during the flowering period. Heavy frosts with cold rain and hail on 22nd and 23rd April caused much damage to fruit blossoms and young fruits newly set.

A cold period in parts of Cork during the first two weeks in June retarded the growth of both fruit and trees.

In Galway, Mayo, Sligo, Donegal and Longford the spring frosts did not damage blossoms and small fruits to any extent. In general, in these districts the dry harsh weather of early summer interfered with the setting of the fruit, but during July, August and early September the fruit developed well, especially in the case of the late cooking varieties.

In Tipperary the spring mildness caused an early flowering, but later the orchards suffered from the almost continuous north east winds and fluctuating temperatures, the days being warm and nights cold. The drought of early July caused many of the fruits to drop off, especially on the drier soils.

In Louth, Cavan, Meath and Monaghan the severe weather which occurred when the Plums and Damsons were in flower or just set, practically destroyed these crops.

In counties Kilkenny and Waterford the frost and penetrating east winds of mid-May destroyed much of the blossoms and young fruit, while low temperatures later during the summer prevented many of the fruits from developing to their normal size.

The early spring weather was very favourable in Wexford, but severe periods of cold dry easterly winds from mid-May to the end of June caused an unusually large number of fruits to drop off; this considerably reduced the yield, particularly of pears and plums. Of the apples, Bramley's Seedling appeared to be most affected.

In Co. Wicklow the weather was most unfavourable during the flowering period, much damage being done to the young fruits by cold rain and hail storms, and by the frosts of the 16th and 17th May. Later in the season, the cold weather prevented the fruit from developing normally.

RASPBERRIES.

In general, the reports indicate that the crop, on the whole, was from an average to a good one.

The plants flowered well, and, in general, escaped the May frosts except in Counties Cork, Dublin and Laoighis where the frost attack resulted in many misshapen fruits. In most cases the fruits were large and firmer than usual.

In County Dublin the variety Norfolk Giant gave an excellent return. In County Kilkenny the plants flowered well, but many of the fruits failed to set.

There was an average crop in County Meath of excellent quality, especially the varieties Lloyd George, Bath's Perfection, and the local seedling varieties grown in Julianstown and Gormanston. Spraying with a Derris preparation was done very generally last season, and, as a result, a crop of berries almost free from weevil maggot was obtained in Meath.

Offaly produced a good yield, but the berries remained small owing to the drought prevailing at the time of ripening.

In Westmeath there was a very good crop of fruit which ripened early. In Co. Wicklow the crop was very good both in quantity and quality, although a few early flowers were injured by frost. In general, the crop was late in ripening in this county.

LOGANBERRIES.

These were, in general, from an average to a very good crop, almost all the reports stating that not only was the crop good, but that the quality was excellent, the fruits being very large, well flavoured and highly coloured.

In County Cork the berries were slow to ripen, and a number was affected by the larvae of the Raspberry Beetle, which seldom attacks Loganberries.

In Kilkenny a very heavy crop was produced, and the fruits ripened earlier than usual.

Only in Counties Westmeath and Wexford was the yield below the average, and this was due to the scorching of the young flowering shoots by cold harsh winds.

In County Wicklow the berries were very numerous, but they were scarcely as large as last year.

STRAWBERRIES.

On sites exposed to the east, strawberries are very often affected by the spring frosts which destroy the early flowers, but very little damage was done last year, and the crop was, in general, slightly earlier than usual. The early berries were also of good size and flavour.

Where the plants had been mulched the crop was very heavy, and they continued to produce good fruit until the end of the season; but where they had not been so treated, the late fruits failed to develop to their proper size. This was chiefly due to the very dry weather which prevailed when these late fruits were swelling.

On the whole, the crop was below average, and this was due to the late fruits not finishing properly. The plants suffered most on light soils.

In County Cork the yield was very good, especially Royal Sovereign; whilst in County Dublin, the fruit was plentiful but small, the best varieties being Royal Sovereign, The Laxton, Oberschlesien and Tardive de Leopold.

In Kildare, Mad Kooi and Royal Sovereign cropped best; and in Cavan and Galway The Leader bore heavy crops.

GOOSEBERRIES.

These were a very heavy crop in general, and in many cases the berries were very large and of excellent flavour.

In County Cork the crop was a good one but slow to ripen, whilst in County Sligo the berries ripened unusually early. The varieties cropping extra well were Whinham's Industry, Keepsake, Early Amber and Careless.

Only in Laoighis and Offaly is it reported that frost in mid-May did much damage to the young fruits. The weather was very suitable during the period when the berries were swelling, with the result that they were larger than usual. In occasional gardens the fruit was somewhat smaller than in past years.

In counties Cavan, Dublin, Galway, Kildare, Kilkenny, Longford, Louth, Mayo, Meath, Monaghan, Roscommon, Tipperary, Waterford and Wexford the crop was the heaviest recorded for some years.

BLACK CURRANTS.

These were an exceedingly good crop and in most cases the fruit was of large size, especially in Counties Cavan, Kildare, Longford, Sligo, Meath and Mayo.

In Clare, though the crop was good, the fruits ripened unevenly. In Cork the yield was not as great as in previous years, many of the flowers on the points of the trusses failing to set. This was chiefly due to the cold harsh winds prevailing at the time.

In County Dublin the yield was very good, and the quality of the fruit was excellent. There was very little dropping off at the points of the flower trusses.

In Counties Kilkenny and Waterford the crop was very variable. In some districts there was a very heavy yield of excellent fruit, whilst in others, especially on exposed sites, many of the flowers failed to set.

In North Mayo and Galway the crop was the largest for a number of years, and the fruit was of exceptionally fine quality.

The varieties cropping well were Victoria, Boskoop Giant, Baldwin, and Davison's Eight. Black Naples was, in general, below the average.

RED AND WHITE CURRANTS.

These fruits are not grown for commercial purposes except in the neighbourhood of Dublin. The fruit offered for sale in other areas is the surplus from private gardens. In the past season the supply exceeded the demand.

On the whole, the crop was a good one, extra heavy returns being obtained in many gardens, and the berries were of exceptional size and flavour.

In Counties Roscommon and Waterford the crop was only fair, and the berries were smaller than usual.

The varieties yielding the heaviest crops were Red Dutch, Raby Castle, and White Dutch.

APPLES.

A heavy coat of blossom encouraged growers to look forward to a bumper crop. Bramley's Seedling was an exception, as this variety did not flower so freely as usual. The flowers in most cases appeared to set fairly well, but the extraordinarily severe weather which was experienced just after setting killed many of the young fruits. Bramley's Seedling seemed to suffer most in this respect.

Reports from growers indicate that less than 40 per cent. of the crops were above average, and these were chiefly in the north-west, west and south-west of the country. Crops in the eastern, east midland and southern counties were not so heavy, nor was the fruit of such good quality as usual. Normally, the western counties suffer most from the frosty and stormy weather in early spring which destroys the flowers and the young fruits.

On the whole, Newton Wonder did not crop as well as usual, but Lord Derbys were fairly good, and in most cases comparatively clean. On the whole, most of the apples were somewhat below the normal size for the variety and, in general, were not of such a high colour as usual. This was chiefly due to lack of sunshine and the low temperature during autumn.

In Carlow the crop was only about half that of last year. Early fruits were plentiful but undersized, especially Lane's Prince Albert, Bramley's Seedling, Bismarck, Annie Elizabeth and Gascoyne's Scarlet. Charles Ross, Cox's Orange Pippin and Worcester Pearmain gave fair yields.

In Cavan both early and late varieties, excepting Bramley's Seedling, were a good crop, but smaller in size than usual. The best croppers were Lane's Prince Albert, Grenadier, Golden Spire, Royal Jubilee, Hambling's Seedling, Allington Pippin and Cox's Orange Pippin. The fruits of Beauty of Bath, though plentiful, were very small in size.

In Clare, yields were well up to average in quantity, and the quality was fairly good. Lane's Prince Albert, Stirling Castle and Cox's Orange Pippin were a light crop, but Allington Pippin and Bismarck cropped well, and were of good quality. The late summer storm caused much damage to first class fruit.

In Cork the crop was light, especially in the case of early varieties. In many of the old orchards there was a heavy crop of small fruit. Bramley's Seedling and Lane's Prince Albert were poor in some districts, whilst in

others, good crops of very fine fruit were obtained. In the north side of the county, Charles Ross, Rival, Grenadier, Allington Pippin, Cox's Orange Pippin, King of the Pippins and Lane's Prince Albert gave good yields of high quality fruit. Newton Wonder yielded well but the fruits were spotty. Gascoyne's Scarlet gave very poor returns.

In County Dublin the crop was below the average both in quantity and quality. Bramley's Seedling and Newton Wonder were poor in general, whilst Allington Pippin, Worcester Pearmain, Lane's Prince Albert and Lord Derby were fairly good. Generally speaking, the fruit was smaller than usual, later in maturing, and good only in sheltered positions.

Excellent crops were reported from Co. Donegal, Bramley's Seedling and Lane's Prince Albert especially being of good size, clean and highly coloured.

In County Galway the crop, in general, yielded very well and was of very good quality, especially the early and mid-season varieties. Bramley's Seedling was good on the whole, though occasional poor crops were reported. The best croppers were Beauty of Bath, James Grieve, Worcester Pearmain, Allington Pippin, Charles Ross, Grenadier and Lord Derby.

There was an exceptionally good crop in Co. Kerry, both of early and late varieties. The fruits in general, were large, well coloured, clean and free from disease.

In Kildare the crop was very uneven. On the whole, only about half the average yield was obtained, and the fruits were smaller than usual. Trees which bore heavy crops in 1934 were very poor in 1935. Early apples were small owing to low temperature and drought, but the late varieties developed fairly well.

The crop in Co. Kilkenny was not as good as in previous years, both quantity and quality being below the average. There was a very promising bloom, but the flowers were injured by the cold rain and hail storms in May. Fruit in general was small and poor in colour. Lord Derby, Allington Pippin and Blenheim Orange Pippin cropped fairly well, and in general the old trees cropped better than the young ones. The early varieties yielded fairly well.

In County Leitrim the trees bore excellent crops of fruit, especially Bramley's Seedling, Grenadier, Lord Grosvenor, Lord Derby and Allington Pippin.

There was an average crop in Laoighis, but the fruit in general was small in size. Bramley's Seedling cropped badly, but the fruit was fairly large and clean. Ecklinville Seedling and Gascoyne's Scarlet were poor in general.

Heavy crops were obtained in Limerick where trees had been properly sprayed and manured. Most varieties bore a fair number of small fruits, which were practically unsaleable. Exceptionally good crops of Bramley's Seedling, Worcester Pearmain, Lady Sudeley, Allington Pippin and King of the Pippins were obtained.

In Offaly, orchards yielded only about one-fifth of a crop, and in gardens, about half a crop was obtained. May frosts killed much of the blossom, while September gales further injured the crop. Bramley's Seedling and

Newton Wonder were particularly poor. Allington Pippin, Charles Ross, Rival, Worcester Pearmain, Hambling's Seedling, Blenheim Orange Pippins, Loddington, Claygate Pearmain, White Transparent, King of the Pippin and Royal Russet all yielded moderate crops in favoured spots.

The crops in County Longford were very good in general. The fruit was of good size, clean and well coloured. With the exception of Newton Wonder, all varieties bore well.

In Louth an average crop was returned. Bramley's Seedling, Grenadier and Lane's Prince Albert did fairly well in most districts. Beauty of Bath, Charles Ross and Worcester Pearmain were the best of the dessert varieties.

It is some years since there were such good crops in County Mayo, and many of the trees had to be thinned. The crops were good on all classes of soils and situations. The early desserts, such as Beauty of Bath and Mr. Gladstone, were slightly below the average in size, but Cutler Grieve, Charles Ross and Allington Pippin bore very large, clean fruits. Bramley's Seedling was very variable, though, on the whole, it was the best of the late cookers.

In Meath the crop was below average in general. It was variable, however, for while in the majority of cases yields were poor, there were some orchards that bore heavy crops. The quality of the fruit was very good, especially the early varieties Worcester Pearmain, Beauty of Bath and James Grieve.

There was a good crop of the early varieties in Monaghan, but the late ones were below the average in quantity and quality.

In County Roscommon the crops were exceedingly heavy, and the quality was very good, there being fewer small fruits than usual. The crop was one of the heaviest on record, Bramley's Seedling, Blenheim Orange, Lord Derby, and King of the Pippins being especially good. Early Victoria and Allington Pippin were poor in general.

Excellent crops were produced in County Sligo, and the fruit was also of good size and quality. Bramley's Seedling, Newton Wonder, Grenadier, Charles Ross and Allington Pippin bore well. Three of the newer varieties viz. Cutler Grieve, Laxton's Superb and Lord Lambourne also cropped well.

In Tipperary the crop of apples was from average to under average. Old orchards cropped very well. In the South Riding the crops were better than in the North.

On the whole, there was a fairly good crop in Waterford, but the fruit was on the small side except where the trees were manured. Of the earlies, Mr. Gladstone, Beauty of Bath and Worcester Pearmain did well. Bramley's Seedling, Lord Derby, Lane's Prince Albert and Blenheim Orange Pippin were the best of the late varieties.

In County Westmeath the crop was below the usual standard, but the quality of the fruit was very good. Bramley's Seedling, Lord Derby, Newton Wonder, Charles Ross, Lady Henniker and Warner's King bore fairly well. The early varieties bore a fair crop of good quality.

In Wexford, early desserts such as Mr. Gladstone, Beauty of Bath and James Grieve had good, large, clean fruit. Tower of Glamis, Christmas Pearmain, American Mother, Ribston Pippin and Ellison's Orange bore

well. The blossoms and small fruits did not suffer much from spring frosts, with the result that there was a fair crop of good quality fruit.

The crop of Bramley's Seedling in Co. Wicklow was very poor, but there was a fairly good yield of Lane's Prince Albert, Blenheim Orange, Lord Derby and Mr. Gladstone.

PEARS

Pears flowered exceptionally freely, both on walls and in the open, on standard, pyramid and bush-shaped trees, but owing to the very unfavourable weather prevailing at the time, there was only a medium set of fruit, and many of these dropped off before commencing to swell. Trees in the open suffered most, as they were subjected to the full blast of the cold, rain, hail and frost. In the warmer counties of the southern area pears fared much better than in the northern counties. On walls and in well-sheltered gardens there were very good crops of excellent fruit.

In County Carlow there was a good crop, the fruit being large and of good quality.

The crop was poor in general in County Cavan. Cooking pears, especially Catillac, bore a good crop of large, clean fruit; but of the others, Williams' Bon Chrétien, Pitmaston Duchess, and Conference were the only varieties which bore even a fair crop.

In Clare the crop was very variable. The earlies, Jargonelle and William's Bon Chrétien cropped well, but the later varieties, such as Pitmaston Duchess, Beurre Hardy, Louise Bonne of Jersey, Conference, Durondeau, and Doyenne du Comice, bore good crops only in well-sheltered situations. In most cases the fruit was of good size.

In Cork there was a small crop of poor quality except on walls and in well-sheltered places. Calabash was good, but Doyenne du Comice was only fair.

The crop in Dublin was, on the whole, below the average, but some very fine quality fruit of Williams' Bon Chrétien, Durondeau, Pitmaston Duchess, Conference, and Doyenne du Comice were offered for sale in the Dublin market from local gardens.

In Donegal there was a bumper crop, the fruit being of good size and quality.

In Galway there was a very good crop throughout, all varieties carrying nice sized fruit of good colour, which ripened earlier than usual. Conference, Fertility and Pitmaston Duchess were the best croppers.

Good yields were obtained on walls in County Kerry, but poor crops were the rule in the open. The fruits in each case were, however, both large and of good quality.

In Kildare, the crops were poor in the open, but on walls the yields were the best obtained for some years, especially those grown as cordons. The best croppers were Pitmaston Duchess, Conference, Doyenne du Comice, Marie Louise, Louise Bonne of Jersey, Durondeau, and Beurre d'Amanlis.

One of the best crops for years is reported from County Kilkenny, both in the open and on walls. The fruit ripened earlier than usual, and was large, clean, and of good quality. Pitmaston Duchess and Conference were the best croppers.

There was a very heavy crop in County Leitrim at the few centres in this county where pears are grown.

In Limerick most varieties yielded a very heavy crop, especially Williams' Bon Chrétien and Jargonelle. The fruit, in general, was also of very fine quality.

In Longford the crop was the best for some years, good sized fruit free from disease being obtained.

In County Louth wall trees bore fairly good crops. In Mayo the crop was very good, with clean, well-coloured fruit, especially the varieties Hesse, Fertility, Conference, Durondeau, Doyenne du Comice, Williams' Bon Chrétien, and Pitmaston Duchess.

The crop was very light in the open in County Meath, but on walls, especially on cordons, there was a very good crop of excellent fruit, particularly the varieties Williams' Bon Chrétien, Durondeau, Beurre Hardy, Beurre Bosc, and Beurre Clairgeau.

In County Monaghan the yield was generally good on walls.

On walls in Offaly there was only about half a crop, while pears in the open were practically a failure. Williams' Bon Chrétien, Conference and Jargonelle bore well, but most of the others gave very poor returns.

In Roscommon there was a good crop, and the fruit was of good quality, especially Louise Bonne of Jersey, Clapp's Favourite and Doyenne du Comice.

The crop was poor in Sligo and the quality indifferent. In Tipperary the crop was good in general, the fruit large, clean, and of exceptionally good quality, especially Beurre Hardy, Catillac, Conference, Pitmaston Duchess and Doyenne du Comice.

In Waterford the crop was much below the average in the open, but was good on walls, especially the varieties Pitmaston Duchess, Beurre Hardy and Doyenne du Comice.

The yield in Wexford was one of the lowest recorded for a number of years, except on old trees against walls. In general, however, the fruit was of good quality.

In Wicklow generally, the crop was poor, and only on well-sheltered walls and gardens was there a fair crop. Many of the fruits dropped in June.

PLUMS.

On the whole, plums were from average to under average. Of 140 reports received, 90 showed average yields and under. Only 50 reported yields above average, and these latter chiefly referred to trees growing on walls. Most trees growing in the open had crops of from average to under average.

The cold winds, with hail and rain showers in the early spring, culminating with a terrific storm during mid-May, destroyed what had been a most promising crop of plums and damsons. It is many years since there was

such a heavy display of flowers in Counties Meath, Dublin, Louth, Cavan, and Monaghan, but owing to the causes stated above much of the fruit failed to set, and much of what did, dropped off afterwards. In general, the crops were larger and fruits of better quality in the western than in the eastern counties.

In County Carlow the crop was more or less variable; Victoria and River's Early Prolific showed fair crops of good fruits, whilst other varieties did not develop well.

In Cavan and Monaghan the crop was poor on the whole, only a few trees of Victoria, Czar, and Early Rivers yielding a fair crop of good quality.

In Clare there was about half a crop. Early varieties such as Early Rivers, The Czar, and Early Orleans finished well, but late varieties such as Victoria, Monarch, and Kirke's Blue were of inferior quality and small in size. In exceedingly well-sheltered gardens, Victoria cropped better than last year.

The crop in Dublin was fair to poor, Victoria being the best. In Galway the crop was very heavy, especially Victoria, Czar, and Blue Diamond, but though well coloured the fruit was not so well flavoured as usual.

The crop in Kildare was very light in the open, but on walls was good, especially Victoria, Czar, Jefferson, Monarch, Golden Drop, and a few old trees of the Horse variety.

In Leitrim, Kilkenny, Offaly, Meath, Monaghan, Westmeath, and Wexford, the crop on the whole, was poor.

In Tipperary, the crop was good, and ripened well, especially in the case of Victoria.

In Waterford the crop was the best for 20 years.

DAMSONS.

These, on the whole, were below average. In Cavan and Monaghan the crop was light. This was also the case in County Meath, except around Julianstown, where there was a heavy crop in some orchards.

In Wexford the yield was small but the quality was good. In Galway there was a very good crop of excellent fruit.

The crop in Kildare was very variable, heavy crops being obtained in some districts, whereas in others very light returns were the rule.

CHERRIES.

On the whole, the yields of cherries might be reckoned as average to below average. In most cases Morello cropped well on walls, and the fruit was large and well coloured. Very few Morello or other cooking cherries are grown in the open. Cherries are not grown on commercial lines to any extent except in Counties Donegal, Dublin, Meath and Wicklow. The fruit from the last three counties is usually sold in the Dublin Fruit Market. The Donegal fruit is usually sold locally.

In County Clare there was a fair crop of good fruit of May Duke, Napoleon, and Governor Wood. The crop was poor in Dublin, but May Duke, Black Heart and White Heart gave fair yields.

In Kildare there was a fair crop on walls, especially of May Duke, Early Rivers, Black Heart and Morello.

The crops of Morello in Limerick were especially good. In Mayo the crop was very good, especially May Duke, on comparatively young trees; while Black Heart, Knight's Early Black, Early Rivers and Elton also yielded well.

There was a very heavy crop with fine colour and flavour in County Wicklow, especially on old trees of Elton. Black and White Hearts, Waterloo, and Black Tartarian gave good returns also.

PEACHES.

Outdoor peaches are not cultivated except to a limited extent in this country, and mainly in old walled gardens. They produced on the whole an average to a good crop, although the cold spring and early summer militated against their giving a good set of fruit, and retarded the usual development. The fruits on the whole were fairly good. The size of the fruit was slightly below the average, but in suitable situations it was of fairly good quality. Generally the fruit was of better size and colour in the south-west and western counties than in the south-east and eastern districts.

Of the 28 growers who furnished records, 10 stated that the crop was average, 9 that it was above average, and 4 that it was under average.

Peaches suffer more from cold weather than from insect or fungoid pests.

The varieties doing best were Hales Early and Royal George.

FIGS.

Figs are not grown out of doors except to a limited extent, as it is only in the southern counties, and against walls having a south or south-west aspect and in a well-sheltered position, that they may be expected to do well, and even then, they require expert attention to make their cultivation a success.

Of 150 fruit growers who sent in reports, only 20 reported upon figs. Of these 11 had an average crop, 7 had a crop above average, and the remaining 2 reported a crop below average.

The season, on the whole, was unfavourable and, though the fruit was fairly plentiful, the flavour was much below the standard of quality associated with figs grown out of doors. The variety which gave the heaviest yield was Brown Turkey.

INSECTS.

Many fruit growers state that, owing to the application of tar-oil winter sprays, and the use of poisonous sprays when the trees are in foliage, insect pests are not so troublesome. Where spraying is neglected, however, the vigour of the trees is impaired, and the yield of good fruit much reduced.

Last year the scarcity of *wasps* was noticed by fruit growers. Only in Counties Clare and Kildare was it reported that they did damage to early apples and plums.

American Blight or Woolly Aphis is causing much damage both on young and old trees in Carlow, Kerry, Kildare, Monaghan, Tipperary, Waterford, Wexford and Wicklow.

Green Fly was not so prevalent as usual, but adverse weather conditions had much to do with this. The Fly did a little damage to young shoots of apple and plum.

Codlin Moth did much damage in Counties Dublin, Kilkenny and Tipperary, even on sprayed trees.

Red Spider was not so troublesome as usual, being worst in Counties Cavan, Dublin, Kildare, Laoighis, Offaly and Mayo.

Capsid Bug is undoubtedly spreading in the country, it being reported from no fewer than ten counties.

Winter Moth caterpillars, and the larvae of Apple Sucker, are still troublesome in Counties Cork, Cavan, Kilkenny, Roscommon, Tipperary, Wexford and Wicklow.

Gooseberry Sawfly was prevalent in Counties Dublin, Kildare, Monaghan, Wexford and Wicklow.

Leaf-curling Aphis, and *Thrips* caused damage to Plums and Apples in Offaly.

Pear Midge was troublesome in County Carlow and County Wicklow.

Bullfinches and Tits did much damage to Plums, Gooseberries, and Cherries, by eating out the small fruit buds just when they were about to open. Blackbirds and Tits also damaged the mature fruit.

FUNGI.

Apple and Pear Scab are by far the most serious fungoid pests the fruit grower has to contend with.

Owing to unsuitable weather conditions prevailing during the spraying period, the usual sprays did not seem to have been so effective this year. Continuous damp weather in August and September was conducive to the spread of Scab on fully grown apples. This was most noticeable in unsprayed orchards, where much of the fruit was rendered unsaleable owing to the disease. In many of the orchards Bramley's Seedling was the most affected, but Irish Peach, Beauty of Bath and Allington Pippin also suffered severely. It was worst in Counties Carlow, Clare, Kildare, Kilkenny, Laoighis, Leitrim, Louth, Mayo, Sligo, Waterford and Wicklow.

Mildew on apples was fairly prevalent in Counties Cavan and Dublin, and chiefly on the varieties Allington Pippin, Cox's Orange Pippin, Ecklinville Seedling, and The Queen.

Apple Canker is still a great source of trouble to growers, and it is very difficult to eradicate. It is not, however, causing as much damage as in past years, mainly owing to the fact that growers destroy the affected portions as soon as noticed. Planting on unsuitable soil is also less prevalent, while the planting of varieties which are liable to canker is becoming less usual.

Brown Rot is still a source of trouble, especially in Counties Dublin, Roscommon, Kerry, Limerick and Westmeath.

Silver Leaf on plums is not so serious as it was since growers have learned the value of stubbing up and burning badly affected trees, and of severely pruning the diseased portions of trees which are only slightly affected. The pest is still reported from Counties Dublin, Donegal, Kildare and South Meath.

American Gooseberry Mildew is still prevalent in some counties, especially in Cork, Kildare, Kilkenny, Offaly, Westmeath, Wexford and Wicklow.

MARKETS.

In general there was a fairly good demand for bush fruits throughout the Saorstát.

In Counties Waterford and Kilkenny the prices ruling were, in general, not so good as in previous years.

In County Sligo, Gooseberries were 2d. to 3d., Strawberries 10d. to 2/-. Raspberries 6d. and Black Currants 5d. to 6d. per lb. Gooseberries were a slow market and are reported as having been sold to jam manufacturers at 9/6 per cwt. Black Currants fetched 50/- per cwt. for jam making.

In County Cork, Strawberries made 1/3, Raspberries 10d., Black Currants 9d. per lb. Green Gooseberries realized 1/3 per gallon, and Strawberries £2 per cwt. for jam making.

In Donegal, Black Currants sold at 4d., Cherries 4d. to 6d., and Strawberries at 10d. to 1/- per lb.

In Dublin the prices were good on the whole, especially for fruit nicely packed, and properly graded. Strawberries brought from 9d. to 2/6 per lb. according to quality and earliness of the season; Gooseberries from 8d. per lb. in the very early season to 2/6—4s. per 12 lb. chip when ripe. Raspberries opened at 1/4 and dropped to 7d. per lb. Black Currants opened at 1/- per lb. punnet, and later dropped to 6d. per lb.

In Kerry there was a fairly good demand for bush fruits for home-jams, especially Gooseberries at 4d. per quart, Black Currants at 4d., and Raspberries at 6d. to 7d. per lb.

Good prices were obtained in Limerick. Black Currants brought 6d.; Strawberries 9d. to 1/9; Raspberries 1/-; Loganberries, 1/- per lb., and Gooseberries 1/6 to 3/- per st.

In County Mayo, Strawberries opened at 2/6, but came down later in the season to 7d. per lb. for small fruits for home jam-making.

In general, the prices obtained for apples early in the season in the various markets, were good. There was a good crop, and the prices obtained at the start raised the hopes of growers that remunerative prices would rule all through the season, sufficient to pay for the cost of production and marketing, and to leave some surplus. This did occur with the very early apples, which in most cases brought 1/6 to 2/- per stone for cookers such as Early Victoria and Grenadier. Desserts, such as Beauty of Bath, Lady Sudeley and Worcester Pearmain realised 2/- to 2/6 per stone.

In County Clare early Desserts brought 6d. to 1/- per dozen, according to quality.

In Cork there was a fair demand for early apples at from 6/- to 9/- per count of 120.

In Dublin there was a good demand for first-class apples properly graded and properly packed. Good quality early Desserts sold well at from 2/6 to 3/- per 12 lb. chip basket. Cookers, such as Grenadier, Ecklinville and Warner's King sold in trays at 3/- to 4/6 per tray of 36 to 40 fruits. In bushel boxes, holding about 40 lbs. each, good quality early Desserts brought 5/- to 7/6 per box, and Cookers 5/- to 7/- per box. Later these latter increased to about 11/- per box.

In Kilkenny the prices varied from 1/6 to 2/- per stone for sound apples. Dessert plums made 6d. to 1/- per lb. and damsons 4/6 to 5/- per stone. After the storm of mid-September, which blew down a large quantity of fruit, there was very little sale for apples, and prices dropped as low as £2 10s. per ton to jam manufacturers.

In Leitrim and Limerick, apples were sold to shopkeepers at 1/- per stone, good dessert fruit at 6d. to 9d. per dozen, and windfalls at 3d. per dozen.

There was a poor sale for varieties in County Longford at 1/6 per stone. Early desserts sold at 6d. to 9d. per dozen. There is a limited local market, and it is not thought remunerative to send to Dublin. Plums sold at 4/6 per stone.

Early apples sold well in Louth, at from 2/- to 2/6 per stone, but mid-seasons were almost impossible to sell owing to the glut of windfalls. Plums sold at 6d. per lb., damsons at 3/- per stone. Pears sold at 1/- to 3/- per dozen according to size and quality Pitmaston Duchess bringing the top price.

In Mayo, cooking apples brought 2/- per stone, and dessert 9d. to 1/- per dozen for very good fruit. Damsons and cherries fetched 6d. per lb., and very good pears 9d. to 1/- per dozen.

In Monaghan the price of apples was very low because of the glut of windfalls.

In Roscommon the local price was from 1/6 to 2/- per stone for good apples, and 1/- for windfalls. Apples sent to Dublin brought from 16/- to 20/- per barrel. Pears realised 2/- per dozen locally for good fruit.

In Sligo the early varieties such as Early Victoria, Grenadier, Beauty of Bath, and Worcester Pearmain sold at satisfactory prices, but after the September gales there was a glut of windfalls, and consequently no demand, with the result that a quantity of these earlies was sold to jam manufacturers at £2 10s. per ton. Early cookers sold at 1/- to 1/6, and desserts at 2/- to 3/- per stone.

In South Tipperary first grade apples made 7d. to 8d. per dozen; plums 7d. per lb., and pears 1/- to 3/- per dozen. The custom here is for dealers to purchase the crop on the trees for a lump sum, and to retail the fruit in the adjacent towns.

In North Tipperary early apples sold at 6d. to 8d. per dozen, and 2/- per stone, while pears sold at 1/- to 3/- per dozen, according to size. Damsons realised 3/6 per stone, plums and cherries 9d. per lb.

There was a good demand for early apples in County Waterford, select desserts bringing as high as from 10/- to 18/- per bushel box, and cookers 1/6 to 2/6 per stone. Pears sold at 1/- to 2/- per dozen, cherries 6d. per lb., and plums at 2d. to 6d. per lb. according to quality, the variety Victoria being in most demand.

Good apples in Wexford sold at 6d. to 8d. per dozen. There was practically no sale for apples of poor quality. Windfalls sold at 3/6 per 120 apples; pears at 1/- to 2/- per dozen, and plums at 8d. per lb.

Local prices in Wicklow were 1/6 to 2/6 per stone for apples, and 1/- per dozen for pears. Much of the Wicklow fruit is sold in the Dublin Market, where apples brought 2/- to 3/- per stone, and 4/- to 6/- per tray. Plums brought 3/- to 5/6 per 12 lb. chip, and cherries from 10d. to 1/1 per lb.

REPORT OF THE SEED PROPAGATION DIVISION, 1935.

WEATHER CONDITIONS.

Weather conditions throughout 1935 were remarkably varied, droughts, floods, severe May frosts, brilliant sunshine, violent gales and long spells of broken weather all being experienced. The first three months of the year were comparatively dry so that corn crops were sown under favourable circumstances. Weather conditions during April were favourable to growth, but the month of May was quite the reverse. The rainfall for this month was unusually low. Moreover, there were severe frosts about the middle of the month which checked growth considerably. The rainfall during June was well above the average, but there was a deficiency of sunshine. The weather during July and well into August was exceptionally fine and dry, so that cereals ripened rapidly and harvesting was general in the early part of the latter month. Towards the end of August the weather broke and rain fell intermittently throughout September and October. At Ballinacurra the rainfall for September was over seven inches, which is a record for the month. Although the rainfall during October was below average, the weather conditions throughout the month were distinctly unfavourable to harvesting operations.

On the whole, the weather conditions throughout 1935 were unfavourable to cereal crops, and harvesting and threshing operations were particularly handicapped by rain and storms during the late autumn. Despite the unsatisfactory weather good yields of grain, especially of barley, were general, and in the early districts, where harvesting was completed before the weather broke, the quality of the produce was of a high standard. In the later districts the completion of harvesting and threshing operations was rendered both difficult and laborious, and the quality of the grain was reduced as a result of undue exposure.

As in previous years, the bulk of the barley propagation work was carried on at the Cereal Station, Ballinacurra, County Cork, in close collaboration with Messrs. A. Guinness, Son & Co., Ltd., at whose Experimental Maltings the malting tests were conducted. The work consisted of the usual pure line propagations, chess-board and half-drill-strip experiments, and an experiment designed to test the efficiency of the new Hornsby-Leake Precision Corn Drill. Large-scale Variety Experiments were conducted at ten centres in seven different counties.

Pure line propagations of Black Tartary oats were conducted at the Cereal Station, and extension plots of Victory II and Glasnevin Success III were grown in the neighbourhood of Ballinacurra. The produce of these latter plots will be available for distribution to seed merchants and selected growers in 1936.

BARLEY.

The method practised for some years past of propagating the pure line of Spratt-Archer 37 No. 3, by sowing five grains from each of twenty-five plants was again adopted; this year for the first time Spratt-Archer 37 No. 4, was propagated by this method also. All the other varieties were propagated by the single plant method, but a change was made in harvesting, in that one ear was taken from each plant in the line, threshed, and sufficient grain taken at random for sowing a single line next spring. The following is a list of the varieties which were grown in single lines in the New Cage.

A number of selections from Spratt-Archer 37 No. 3 x Victory, Kenia x Neils Franchen, and Kenia x D.S.K. Binder in the F.I. generation were propagated in addition to the following 67 single plant selections:—

Spratt-Archer 37/6.
 Spratt-Archer 37 No. 3 (5 grains each from 25 plants).
 Spratt-Archer 37 No. 4 (5 grains each from 25 plants).
 Spratt-Archer 37 No. 3 (1 ear 27 grains).
 Goldthorpe (1 ear 27 grains).
 Spratt-Archer 37/12/41.
 Spratt-Archer 37/17/52.
 Archer Goldthorpe 4/5/1.
 Spratt.
 Archer.
 Goldthorpe.
 Old Irish.
 Abed Rex x Spratt-Archer 37/18 6/3/2.
 Donegal 2 Rowed No. 1.
 Donegal 2 Rowed No. 2.
 Donegal 2 Rowed No. 3.
 Donegal 2 Rowed No. 4.
 Burton Malting.
 Opal.
 Victory.
 D.S.K. Binder.
 Spratt-Archer 37/18 x Goldthorpe Spratt 18/1 2/3.
 Plumage Archer.
 Duck Bill.
 Hybrid No. 1 C.
 Hybrid No. 4 A.
 Hybrid No. 4 Bl.
 Hybrid No. 7.
 July 6 Rowed.
 Mansholts 6 Rowed.
 Beavens F. 112.
 Donegal 6 Rowed.
 Norwegian 6 Rowed.
 Glabron.

Black.

Pearl.

Kenia.

Neils Franchen.

Naked Barley.

Golden Archer 1.

Golden Archer 2.

Spratt-Archer 37 No. 3 x July 6 Rowed 1/1.

Spratt-Archer 37 No. 3 x July 6 Rowed 2.

Spratt-Archer 37 No. 3 x July 6 Rowed 10/1.

Spratt-Archer 37 No. 3 x July 6 Rowed 22.

Spratt-Archer 37 No. 4 x July 6 Rowed No. 1.

Spratt-Archer 37 No. 4 x July 6 Rowed 2/1.

Spratt-Archer 37 No. 4 x July 6 Rowed 2/2.

Spratt-Archer 37 No. 4 x July 6 Rowed 16/2.

D.S.K. Binder x July 6 Rowed 1/1.

D.S.K. Binder x July 6 Rowed 1/2.

D.S.K. Binder x July 6 Rowed 2.

D.S.K. Binder x July 6 Rowed 3.

D.S.K. Binder x July 6 Rowed 4.

D.S.K. Binder x July 6 Rowed 5.

D.S.K. Binder x July 6 Rowed 7.

D.S.K. Binder x July 6 Rowed 9/2.

Spratt-Archer 37 No. 3 x Victory 1.

Spratt-Archer 37 No. 3 x Victory 2.

Spratt-Archer 37 No. 3 x Victory 5.

And 7 selections from a hybrid of Spratt-Archer x Goldthorpe.

The following varieties were grown in garden plots:—

Spratt-Archer 37/6 No. 7 (ex Hunter).

Spratt-Archer 37/9.

F. 112 x July 6 Rowed 49/2/3 (ex Beaven).

F. 112 x July 6 Rowed 49/14/3 (ex Beaven).

F. 112 x July 6 Rowed 49/10/1 (ex Beaven).

F. 112 x July 6 Rowed 50/9/1 (ex Beaven).

F. 112 x July 6 Rowed 49/24/7 (ex Beaven).

F. 112 x July 6 Rowed 50/1/7 (ex Beaven).

F. 112 Autumn Sown (ex Beaven).

July 6 Rowed Autumn sown (ex Beaven).

B. 244 (ex Beaven).

Spratt-Archer 37/6.

Spratt-Archer 37 No. 3 (5 grains each from 25 plants) 25 lines.

Spratt-Archer 37 No. 4.

Spratt-Archer 37/12/41.

Spratt-Archer 37/17/52.

Abed Rex x Spratt-Archer 37/18 6/3/2.

Donegal 2 Rowed No. 1.

Victory.

D.S.K. Binder.

Spratt-Archer 37 No. 18 x Goldthorpe-Spratt 18/1 2/3.

Hybrid No. 1 C.

Hybrid No. 4 A.

Hybrid No. 4 B1.

Golden Archer 1.

Golden Archer 2.

Spratt-Archer 37 No. 3 x July Rowed 1 1.

Spratt-Archer 37 No. 3 x July 6 Rowed 10 1.

Spratt-Archer 37 No. 4 x July 6 Rowed 1.

Spratt-Archer 37 No. 4 x July 6 Rowed 2 1.

Spratt-Archer 37 No. 4 x July 6 Rowed 2/2.

Spratt-Archer 37 No. 4 x July 6 Rowed 16/2.

D.S.K. Binder x July 6 Rowed 1 2.

D.S.K. Binder x July 6 Rowed 2.

D.S.K. Binder x July 6 Rowed 3.

D.S.K. Binder x July 6 Rowed 4.

D.S.K. Binder x July 6 Rowed 5.

Spratt-Archer 37 No. 3 x Victory 1.

Spratt-Archer 37 No. 3 x Victory 2.

Spratt-Archer 37 No. 3 x Victory 5.

Of the above varieties Spratt-Archer 37/6 No. 7 (ex Hunter) was obtained from Dr. Hunter of Cambridge, and the six selections of F. 112 x July 6 Rowed from Dr. Beaven.

B. 244 is also a six rowed variety produced by Professor Engledow of Cambridge University, its chief characteristic being its strength of straw. It is, however, later in ripening than the other six rowed varieties grown. Student 1 and 2 are narrow eared selections from a hybrid of Spratt-Archer and July 6 Rowed made by "Student."

Twenty of the above varieties were grown in Field plots, and of these, eight varieties were grown a stage further in 1st pedigree plots in order to provide sufficient seed for large scale experiments.

Spratt-Archer 37 No. 3 was grown in second pedigree plots on four farms in the vicinity of Ballinacurra to the extent of approximately thirty-two acres. The produce of these plots will be available in 1936 for distribution under the Department's scheme for the distribution of pedigree Seed Barley to members of the Irish Maltsters' Association and others interested in the propagation of seed barley. Under this scheme 351½ barrels of pure line Spratt-Archer 37 No. 3 were distributed in 1935 as follows:—

	Brls.	Sts.
P. J. Roche & Sons, Ltd., New Ross, Co. Wexford ..	10	0
Deasy & Co., Clonakilty, Co. Cork	5	0
Beamish & Crawford, Ltd., Cork	5	0
Robert Perry & Sons, Ltd., Rathdowney, Laoighis ..	5	0
John Bolger & Co., Ferns, Co. Wexford	10	0

	Brls.	Sts.
The Birr Maltings, Ltd., Birr, Offaly	20	0
F. A. Waller & Co., Ltd., Banagher, Offaly	12	0
Joshua Watson & Co., Ltd., Carlow	26	0
George Read & Co., Roscrea, Co. Tipperary	20	0
Minch, Norton & Co., Ltd., Athy, Co. Kildare	40	0
Minch, Norton & Co., Ltd., Nenagh, Co. Tipperary	15	0
Minch, Norton & Co., Ltd., Bagenalstown, Co. Carlow	15	0
Minch, Norton & Co., Ltd., Barracore, Goresbridge, Co. Kilkenny	10	0
Minch, Norton & Co., Ltd., Stradbally, Laoighis	30	0
Cairnes Ltd., Drogheda, Co. Louth	10	0
A. J. M. Reeves, Athgarvan, Newbridge, Co. Kildare	3	0
P. O'Meara & Sons, Thurles, Co. Tipperary	10	0
D. Smithwick & Co., New St., Kilkenny	3	8
Robert Gibney & Co., Ltd., Portlaoighise	10	0
W. J. O'Keefe & Sons, Wexford	7	0
P. & H. Egan, Ltd., Tullamore, Offaly	20	0
D. E. Williams, Ltd., Tullamore, Offaly	25	0
J. & A. Tarleton, Ltd., Tullamore, Offaly	15	0
D. E. Williams, Ltd., Birr, Offaly	25	0
Total ..	351	8

In addition to the above, other varieties of pedigree seed were distributed as follows :—

	Brls.	Sts.
July 6 Rowed.		
To the Agricultural School, Athenry, Co. Galway ..	3	0
D.S.K. Binder.		
To Mr. P. J. Connolly, Ravensdale, Dundalk ..	3	8
Victory.		
To the Agricultural School, Athenry	4	0

Inspection of Growing Plots.

Under the Scheme for the distribution of Pedigree Seed the Department arranged for the inspection of growing crops of barley during the summer of 1935. For inspection purposes these crops were divided into three classes :—(1) crops grown from pedigree seed obtained from Ballinacurra Cereal Station in 1935 ; (2) crops grown from seed the produce of pedigree seed obtained from the Cereal Station in 1934 and (3) crops grown from commercial seed of the Spratt-Archer variety.

A total of 5,337 $\frac{3}{4}$ acres was inspected, and of these 4,935 $\frac{1}{2}$ acres were passed as likely to produce grain suitable for seed purposes. Of the 521 $\frac{3}{4}$ acres inspected under Class (1) 516 $\frac{3}{4}$ acres were passed as suitable for seed purposes, that is, less than 1 per cent. was rejected. Of the 2,914 $\frac{3}{4}$ acres inspected under Class (2), 151 $\frac{1}{4}$ or slightly more than 5 per cent. were

rejected as likely to be unsuitable for seed, and of the 1,901 $\frac{1}{4}$ acres included in Class 3, 246 acres or approximately 13 per cent. were rejected. These results represent a general improvement as compared with previous years. A comparatively small number of crops was found to be affected with Smut or other diseases. The bulk of the crops was rejected because of the fact that other varieties of barley were grown in close proximity to them.

It is satisfactory to record that many of the firms who co-operated with the Department in the working of this Scheme have now reached the stage when the entire crop produced from seed supplied by them is passed annually as likely to be suitable for seed purposes. There is, however, a limited number of firms who do not appear to take adequate precautions in selecting suitable growers or in maintaining the purity of their seed stocks, with the result that a relatively high proportion of the crops grown from the seed supplied by them is rejected each year as unsuitable for seed purposes.

Large Scale Variety Experiments.

These experiments were again carried out at ten centres, situated in Counties Cork, Kilkenny, Louth, Tipperary, Kildare, Offaly and Wexford. The seed for all plots was drawn from the produce of the first pedigree plots of the four varieties grown at Ballinacurra in 1934. The rate of seeding throughout was approximately ten stones per statute acre. Before dispatch from Ballinacurra the seed was dressed with Agrosan powder at the rate of 8 ozs. per barrel of seed. The area of the plots at all centres was three-quarters of a statute acre each.

Of the varieties which were included, Spratt-Archer 37 No. 3 and Spratt-Archer 37 No. 4 are already well known. Hybrid No. 4 B1 is a hybrid which was produced at the Ballinacurra Cereal Station, and is a cross of Spratt-Archer 37, 6 with Beardless. It had previously done well in both Chessboard and Half-Drill Strip experiments and was an outstanding variety at Ballinacurra in 1934. Golden Archer is a variety produced at Warminster by Dr. Beaven, from whom this stock was obtained in 1934.

The produce of all the plots was malted and tested at the Experimental Maltings of Messrs. A. Guinness, Son & Co., Ltd. In Table I the names and addresses of the growers, the nature of the soil and sub-soil, the crops which were grown in the previous two seasons, and the dates of sowing and harvesting are set out.

Owing to unfavourable weather conditions it was rather late in the season when some of the crops were sown. However, in the case of one of the experiments located on the farm of Mr. Carroll, Nenagh, exceptionally high yields of good quality grain were obtained even though sowing was delayed until late in the month of April. In the early stages of growth, Golden Archer appeared to be the most vigorous variety, but the severe frost in the second week of May, while affecting all varieties somewhat, damaged this variety most, especially in the trial located on the farm of Mr. Watkins, Birr. Golden Archer was slower in coming into ear than any of the other varieties and it was also the last variety to ripen, being about

5 days later in this respect than the other varieties. Hybrid No. 4 B1 throughout the season gave promise of the best results, but this was not fulfilled at threshing time. The average returns from all four varieties show little variation, and a similar remark applies to the value of the produce of each variety.

In Table II are set out the weights of grain and the average value as determined by independent judges.

In Table III, the analyses of the samples in the various plots are set out in detail.

Taking into account the yields, values and analyses it will be observed that Spratt-Archer 37 No. 3 maintained its superiority over the other varieties included in the experiments.

TABLE I.—LARGE SCALE BARLEY VARIETY EXPERIMENTS, 1933.

Centre	Name and Address of Grower	Description of Soil	Previous Crops	Date of Sowing	Date of Harvesting
1	Mrs. Tait, Rostellan, Co. Cork ..	.. Medium Loam Sub-Soil Shale	.. Oats, 1933 .. Rootfs, 1934	.. April, 16	.. August, 8
2	Mr. Carroll, Belleen, Nenagh ..	.. Medium Loam Sub-Soil Shale	.. Barley, 1933 .. Beet, 1934	.. .. 24	.. .. 24
3	J. Bryan, Dunbell, Kilkenny ..	.. Medium Loam Sub-Soil Limestone	.. Oats, 1933 .. Turnips, 1934	.. .. 16	.. .. 23
4	William Watkins, Coolnagrower, Birr, Offaly	.. Light Loam Sub-Soil Limestone	.. Barley & Oats, 1933 .. Rootfs, 1934	.. .. 14	.. .. 26
5	D. O'Brien, Ballinamere, Tullamore, Offaly	.. Medium Loam Sub-Soil Limestone	.. Oats, 1933 .. Turnips, 1934	.. .. 22	.. .. 12
6	M. P. Minch, Rockfield, Athy, Co. Kildare	.. Deep Loam Sub-Soil Gravel	.. Barley, 1933 .. Rootfs, 1934	.. March, 15	.. .. 6
7	Mrs. Segrave, Dunany, Dunleer, Co. Louth	.. Heavy Loam Sub-Soil Gravel and Clay	.. Wheat, 1933 .. Turnips, 1934	.. April, 5	.. .. 26
8	N. Howlett, Ramsgrange, Co. Wexford ..	.. Stiff Loam Sub-Soil Shale	.. Grass, 1933 1934	.. .. 3	.. .. 19
9	P. Byrne, Ballygrangans, Co. Wexford ..	.. Sandy Loam Sub-Soil Gravel	.. New Grass, 1933 .. 2nd Crop Grass, 1934	.. March, 20	.. .. 17
10	D. Morris, Tomahurra, Enniscorthy ..	.. Shaly Loam Sub-Soil Shale	.. Oats, 1933 .. Rootfs, 1934	.. .. 19	.. .. 9

TABLE II.

LARGE SCALE BARLEY VARIETY EXPERIMENTS, 1935.—YIELD AND VALUE OF GRAIN PER STATUTE ACRE.

CENTRE	SPRATT-ARCHER 37 No. 3						SPRATT-ARCHER 37 No. 4						HYBRID No. 4B 1						GOLDEN ARCHER					
	Yield of			Total* value including Screenings			Yield of			Value per Barrel			Yield of			Value per Barrel			Yield of			Value per Barrel		
	Dressed Grain	Sts.	Brls.	Dressed Grain	Sts.	Brls.	Dressed Grain	Sts.	Brls.	Dressed Grain	Sts.	Brls.	Dressed Grain	Sts.	Brls.	Dressed Grain	Sts.	Brls.	Dressed Grain	Sts.	Brls.	Dressed Grain	Sts.	Brls.
<i>Cork :</i>																								
Mrs. Tait ..	16 13	3	14 7	12 6 8	16 11	2	14 5	12 2 2	15 12	2	14 8	11 12 0	16 7	2	14 9	12 3 5½								
<i>Tipperary :</i>																								
Mr. Carroll ..	16 5	5	14 9	12 3 1	16 1	5	14 9	11 19 5	18 3	8	14 5	13 6 2½	15 7	13	14 3	11 6 6								
<i>Kilkenny :</i>																								
J. Bryan ..	12 8	24	14 3	9 10 1½	13 9	19	14 5	10 5 6	14 2	13	14 2	10 6 7	13 6	21	14 5	10 3 4								
<i>Offaly :</i>																								
Wm. Watkins ..	10 3	5	14 8	7 11 11	10 11	3	14 8	7 18 3	10 9	2	14 7	7 15 0	9 3	4	14 10	6 18 3								
D. O'Brien ..	14 1	4	14 5	10 4 9	14 3	4	14 5	10 6 6½	13 4	3	14 6	9 13 7½	12 9	3	14 6	9 3 8								
<i>Kildare :</i>																								
M. P. Minch ..	11 12	2	14 5	8 10 4½	12 6	2	14 9	9 3 3½	12 1	2	14 8	8 17 11	12 13	2	14 10	9 11 0½								
<i>Louth :</i>																								
Mrs. Segrave ..	10 11	11	14 6	8 0 5½	10 8	7	14 6	7 15 9	11 8	5	14 8	8 11 3	10 14	5	14 8	8 2 0								
<i>Wexford :</i>																								
N. Howlett ..	14 15	16	14 2	10 19 7	14 10	16	14 2	10 15 2	14 1	15	14 3	10 7 10½	13 7	16	14 3	9 19 5								
D. Morris ..	13 13	2	14 6	10 1 3	13 6	3	14 7	9 16 6½	13 8	3	14 10	10 1 9	12 8	2	14 8	9 4 4								
P. Byrne ..	16 0	2	14 10	11 18 4	13 9	2	14 9	10 1 0½	13 10	2	14 9	10 1 11½	18 4	2	14 8	13 8 8								
Total ..	137 1	74		101 6 6½	135 10	64		100 3 5	136 10	55		100 14 2	134 14	70		100 0 8								
Average ..	13 11	7		10 2 7½	13 9	6		10 0 4	13 11	5		10 1 5	13 8	7		10 0 1								

* Screenings valued at 6d. per stone.

TABLE III.
LARGE SCALE BARLEY VARIETY EXPERIMENTS, 1935. ANALYSIS OF PRODUCE.

GROWER	SPRATT-ARCHER 37 No. 3				SPRATT-ARCHER 37 No. 4				HYMRO 4B 1				GOLDEN ARCHER			
	Bushel Weight	Moisture %	On Dry Matter		Moisture %	Bushel Weight	Nitrogen %	On Dry Matter		Moisture %	Bushel Weight	Nitrogen %	Moisture %	Bushel Weight	Nitrogen %	On Dry Matter
			Wt. of 1,000 Corns	Nitrogen %				Wt. of 1,000 Corns	Nitrogen %							
Mrs. Tait ..	55.0	19.3	36.3	1.59	19.8	54.7	36.6	36.6	1.60	18.8	54.9	36.5	18.4	56.4	38.5	1.58
Wm. Watkins ..	54.0	17.5	34.0	1.29	18.4	53.8	35.7	35.7	1.31	20.7	53.5	37.0	18.1	55.0	35.5	1.37
J. Bryan ..	54.0	18.8	36.0	1.77	17.5	54.3	36.5	36.5	1.73	21.5	53.4	37.0	17.1	55.5	37.0	1.72
M. Carroll ..	54.9	19.7	37.9	1.52	19.5	55.4	40.0	40.0	1.51	19.0	55.4	40.0	18.9	55.6	39.2	1.73
Mrs. Segrave ..	54.7	19.6	34.4	1.29	19.2	54.3	35.3	35.3	1.36	18.9	53.4	38.4	19.7	55.5	36.3	1.35
N. Howlett ..	54.8	18.0	34.5	1.58	17.8	55.4	35.5	35.5	1.70	17.4	55.4	35.2	17.7	55.6	36.1	1.75
M. P. Minch ..	56.0	17.7	35.6	1.28	17.2	54.8	38.1	38.1	1.34	17.3	57.4	39.3	18.5	57.3	38.5	1.33
P. Byrne ..	56.2	17.7	36.5	1.41	18.8	57.1	36.5	36.5	1.41	17.8	56.5	39.4	19.1	56.3	37.8	1.56
D. Morris ..	55.3	16.1	31.9	1.41	15.8	55.2	32.6	32.6	1.49	15.7	56.9	36.1	16.0	57.1	33.2	1.49
D. O'Brien ..	55.2	18.3	32.5	1.45	18.3	54.8	33.9	33.9	1.46	19.2	53.8	35.9	18.8	55.0	34.9	1.55
Average ..	55.0	18.3	35.0	1.46	18.1	55.0	36.1	36.1	1.49	18.7	55.1	37.5	18.2	55.9	36.7	1.54

Half Drill Strip Experiments.

Two of these experiments were carried out on the land of Messrs. J. H. Bennett, Limited.

No. 1 experiment was conducted with Spratt-Archer 37 No. 3 and a hybrid Spratt-Archer 37/18 x Goldthorpe-Spratt 18/12 3. The weight of grain from the strips is shown in Table IV, where it will be seen that on the average the difference is quite insignificant. The general appearance of the hybrid was uneven and the straw not so good as that of the Spratt-Archer 37 No. 3. In the hybrid also, the nitrogen is definitely higher and the malting results show that it is of exceptionally poor malting material, as was one of its parents—Spratt-Archer 37/18.

No. 2 experiment was with two generations of the pure line of Spratt-Archer 37 No. 3; its purpose was to observe whether any deterioration was taking place in this standard variety. The results are also set out in Table IV, and show that, on the average, the two generations are identical. The slight difference shown in the nitrogen was not borne out by the malting results, which were almost identical for the two generations.

TABLE IV.

HALF DRILL STRIP EXPERIMENTS, 1935.

No. 1 Experiment.				No. 2 Experiment			
S-A 37 No. 3.				S-A 37, 18 x G-S 18/12/3		Field Plot	Second Pedigree
	sts. lbs.				sts. lbs.		
a	2	9	B	2	8	3	0½
C	2	12½	b	2	7½	2	12
c	2	12	D	2	12	2	13
E	2	9	d	2	6½	2	12
e	3	1½	F	2	7	3	0½
G	2	13	f	3	0	3	1¾
g	3	4	H	3	1	3	5
I	2	12½	h	2	13½	3	1½
i	3	0	J	2	12	3	8¾
K	2	2½	j	2	13	3	1
k	2	5½	L	2	8½	3	5¼
M	2	13	l	2	13	3	10
m	3	6	N	3	1¼	3	10½
P	3	4	n	3	8	3	12
p	3	5	Q	3	2	3	8½
R	3	5½	q	3	4½	3	12½
r	3	8½	S	3	3	3	13
T	3	7¾	s	3	5	3	11
t	3	2½	V	3	4	4	2
W	3	3	v	3	3½	4	2½
w	3	3½	X	3	3	4	1½
Y	3	1	x	3	2	3	10
Total	..	67	1¼	65	12¼	77	0¾
Average Weight	..	3-0.7		2-13.9		3-7.0	3-6.5
Moisture %	..	17.6		17.1		16.3	16.4
Nitrogen %	..	1.39		1.48		1.36	1.41
1000 Corn Wt.		35.7 grms.		41.6 grms.		36.8 grms.	35.9 grms

Small Scale Quantitative Experiments.

There were two of these experiments. Both were set out in the usual way in three blocks, the arrangement of the plots in each block varied, but in each case they were in balanced randomness. There were fifteen replications of each variety, and the figures given in Table V are the mean of these fifteen replications. In No. 1 experiment, seven new varieties were tested against the standard variety, Spratt-Archer 37 No. 3. Of these only one, namely a hybrid D.S.K. Binder x July 6 Rowed No. 3, surpassed the standard in yield, but its superiority was not significant. As regards its nitrogen and 1,000 corn weight, these were both higher than

the standard, which tends to show that it is not likely to be superior from a malting point of view. None of the other varieties in this experiment would appear worthy of further consideration.

No. 2 experiment was the continuation of a series of investigations, known as the Dr. Hincheliff series, into the differences observed in the produce of twenty-two grains taken off a single ear of Spratt-Archer 37 No. 3. It had been found, by previous observation and experiment, that the produce of the individual grains varied, and that the variations remained constant. In this experiment, which was conducted outside the cage, there were the produce of seven grains with certain known variations, and Spratt-Archer 37 No. 3 taken from a pure line bulk sown as a standard. The object of the experiment was to find out the relative values of the seven selections. The selections were, Nos. 1, 2, 5, 9, 10, 15 and 21. Nos. 1 and 15 were known to vary considerably from the others, and also to give the poorest malting results. Nos. 2, 9 and 21 had been found to give the best malting results, and Nos. 5 and 10 were intermediate in this respect.

In Table V it will be seen that No. 1 gave the lowest yield and that No. 9 gave a significantly higher yield than any of the others, which, with the exception of No. 1, all gave a heavier yield than the standard. The percentage of nitrogen in No. 9, while not quite as low as that of the standard, had a quite insignificant difference. Moreover, there is no great difference in the nitrogen content of any of the seven selections.

TABLE V.
SMALL SCALE QUANTITATIVE EXPERIMENT.—AVERAGE OF FIFTEEN REPLICATIONS.

VARIETY	No. of Plants	No. of Ears	Weight of Ears	Weight of Straw	Weight of Grain	Co-efficient of Migration %	Moisture %	Nitrogen %	Weight of 1000 Corus
<i>No. 1 Experiment.</i>									
D.S.K. Binder x July 6 rd. 3	96	254	296.17	242.19	237.19	44.0	15.2	1.50	41.4
Spratt-Archer 37 No. 3	99	238	292.50	280.17	230.81	40.0	15.6	1.34	38.7
Neils Franchen	96	210	274.31	217.60	223.43	45.3	15.3	1.56	45.8
D.S.K. Binder x July 6 rd. 2	97	238	276.43	231.84	222.11	43.7	15.3	1.44	41.6
S.-A. 87 No. 4 x July 6 rd. 2/1	96	218	248.21	261.72	194.61	38.1	15.1	1.61	42.5
S.-A. 87 No. 4 x July 6 rd. 2/2	98	199	239.95	250.79	184.96	37.2	15.0	1.72	44.5
S.-A. 87 No. 3 x July 6 rd. 10/1	95	208	231.67	245.80	181.77	37.9	15.1	1.59	40.0
Student I.	91	208	237.91	256.84	179.41	36.3	15.5	1.33	41.7
<i>No. 2 Experiment.</i>									
Dr. H. No. 9	95	315	325.37	430.78	271.98	36.1	15.2	1.26	36.9
Dr. H. No. 5	95	308	321.84	433.19	267.13	35.4	15.1	1.27	36.4
Dr. H. No. 10	96	315	319.25	419.85	265.96	36.0	15.1	1.26	35.9
Dr. H. No. 2	95	324	326.24	446.24	263.29	34.8	15.1	1.33	35.3
Dr. H. No. 21	95	310	320.00	426.09	263.04	35.5	15.0	1.27	36.4
Dr. H. No. 15	93	286	300.44	476.03	252.99	32.8	15.4	1.27	38.8
Spratt-Archer 37 No. 3	80	289	298.73	418.20	243.94	34.2	15.1	1.23	35.2
Dr. H. No. 1	95	257	264.48	400.60	219.19	33.7	15.1	1.34	35.7

An Experiment to compare the Hornsby-Leake Precision Corn Drill with the Force Feed Drill.

This experiment was designed to test the Hornsby-Leake Drill sowing at two different rates of seeding, namely, approximately 10 stones and 8 stones of seed per statute acre with the Force Feed Drill sowing at the rate of approximately 10 stones per statute acre.

The experiment was arranged on lines somewhat similar to the Half Drill Strip experiments, in so far that it consisted of a number of strips sown over a distance of 90 yards, ten of which (five at each end) were cut out and discarded at harvest time, leaving a length of 80 yards for experimental purposes. Each strip was sown with twelve coulters of each machine. The order of sowing was so arranged that the three strips, one at each rate of sowing, were side by side fifteen times, so that direct comparison could be made with the fifteen replications.

Before commencing this experiment, it was found necessary to carry out a number of preliminary trials to ascertain the correct adjustment of the indicator for each rate of sowing. This was done by jacking up each machine so that the wheels could revolve. The amount of grain discharged for a given number of revolutions of the wheels was then weighed, and the weight of grain per acre, capable of being sown when the indicator was in a fixed position, calculated. In the course of these preliminary trials it was found that the rate of seeding varied according to the speed at which the wheels revolved. A difference of 5 per cent. was easily attained. It was found too, that the more rapidly the wheels were revolved the less was the quantity of seed sown. The sowing was done with the greatest care so as to eliminate as far as possible all sources of error.

The results are set out in Table VI, from which it will be seen that practically similar returns were, on the average, obtained from the Hornsby-Leake drill sowing at eight stones per acre and the Force Feed drill sowing at ten stones. Although the average returns from the strips sown with the Hornsby-Leake drill at the heavier rate of seeding are lower than those from the lighter seeding, the difference is not significant.

TABLE VI.

HORNSBY-LEAKE EXPERIMENT, 1935.

	Hornsby-Leake Drill sowing at 8 stones per statute acre	Hornsby-Leake Drill sowing at 10 stones per statute acre	Force Feed Corn Drill sowing at 10 stones per statute acre
	sts. lbs.	sts. lbs.	sts. lbs.
	7 12½	7 12	7 0
	7 7	6 12	8 9
	7 0	7 4	7 1½
	6 9½	7 5	8 0
	6 7	6 10½	7 0¾
	7 3	7 0	8 6
	6 10½	7 6	6 6
	6 12	6 7	7 4
	6 6¾	6 7	5 13
	6 13	5 10¼	7 6½
	6 10	6 5¼	6 3½
	7 12	6 11¾	7 6¼
	7 9½	7 3½	7 1½
	7 10	7 3¼	7 1½
	8 9	7 10¾	6 13
Total ..	108 5¾	104 10¼	108 2½
Average Weight ..	7 3.2	6 13.7	7 2.9
.. Moisture % ..	16	16.1	16.3
.. 1000 Corn Wt.	35.1 grms.	36.5 grms.	36.6 grms.
.. Nitrogen % ..	1.82	1.80	1.29

OATS.

Pure Line.

A single plant selection and a garden plot of Black Tartary Oats were grown at the Cereal Station, Ballinacurra, in order to retain a nucleus of this variety.

Department's Extension Plots.

In order to provide supplies of pedigree seed oats for seed merchants and others interested in the distribution of seed oats, stocks of pedigree Victory II and Glasnevin Success III were grown under agreement with selected farmers in the neighbourhood of Ballinacurra. These stocks were grown, harvested and threshed under the Department's supervision. The produce, amounting to approximately 900 barrels, which was dried and cleaned, will be available for distribution in the spring of 1936.

In the following list are set out the names and addresses of the farmers who grew these stocks, together with particulars as to the average sown, and the yield obtained :—

VICTORY II.

	Acres	Brls.	Sts.
James Deasy, Barrycourt, Carrigtwohill, Co. Cork ..	6	6	12
P. O'Keeffe, Ardra, Rostellan, Co. Cork ..	4	4	8
T. Twomey, Ballintubber, Carrigtwohill, Co. Cork ..	5	5	10
Mr. Kelleher, Geragh, Ballinacurra, Co. Cork ..	4½	5	0
D. Mulcahy, Ballintubber, Carrigtwohill, Co. Cork ..	5	5	10
R. Barry, Broomfield, Midleton, Co. Cork ..	6	6	12
J. Whelan, Ballymartin, Dungourney, Midleton, Co. Cork	5	5	10
Mrs. Tait, Hermitage, Rostellan, Co. Cork ..	7	8	11
Do. do. do. do. ..	9	10	0
Total ..	51½	59	3

GLASNEVIN SUCCESS III.

	Acres	Brls.
William Leahy, Carrigagower, Ballinacurra, Co. Cork ..	8	9
Wm. Tait, Buckstown, Rostellan, Co. Cork ..	7	8
J. Hegarty, Ballinbeg, Rostellan, Co. Cork ..	7	8
J. Reilly, Ballinbointra, Carrigtwohill, Co. Cork ..	3½	4
Total ..	25½	29

The seed sown on these farms was obtained from the Albert Agricultural College, Glasnevin, Dublin.

Scheme for the Distribution of Pedigree Stocks of Seed Oats, 1935.

Continuing the scheme adopted in 1933, nucleus stocks of Victory II and Glasnevin Success III were distributed to Seed Merchants and others in 1935. It is intended that the produce where suitable will be used for sowing in 1936, so that the firms concerned should have available, after the harvest, considerable supplies of good quality home grown seed. It is also hoped that it will be possible in each succeeding year to allocate "Foundation" stocks of pure line seed of suitable varieties to reliable firms who will be prepared to propagate them in accordance with the terms of the scheme. In this connection stocks were supplied to the following in 1935 :—

VICTORY II.

J. H. Bennett, Ltd., Ballinacurra, Co. Cork.
 Kilcavan Co-op. Milling Society, Offaly.
 R. Acton, 18 Long Quay, Kinsale, Co. Cork.
 McKenzies, Camden Quay, Cork.

M. Rowan & Co., 51-52 Capel Street, Dublin.
 P. S. O'Loughlin, Carnew, Co. Wicklow.
 N. Hardy & Co., Ltd., 72 Park Street, Dundalk.
 Lombardstown Co-op. Society, Lombardstown, Co. Cork.
 R. Stephens, Langford Street, Killorglin, Co. Kerry.
 T. Wade, Straffan, Co. Kildare.
 Minch. Norton & Co., Ltd., 10 Westmoreland St., Dublin.
 D. E. Williams, Ltd., Tullamore, Offaly.
 Suttons, Ltd., Cork.
 D. J. Bergin, 29-30 Smithfield, Dublin.
 The Agricultural School, Clonakilty, Co. Cork.
 The Agricultural School, Ballyhaise, Co. Cavan.
 John Wilson, Kiltegan, Co. Wicklow.
 The Agricultural School, Athenry, Co. Galway.
 E. McCaul, Main Street, Carrickmacross.
 W. Drummond & Sons, Ltd., 57 & 58 Dawson St., Dublin.
 W. Boggan, Gorey, Co. Wexford.
 F. A. Waller & Co., Ltd., Banagher.
 M. Kelleher & Sons, Ltd., Tralee, Co. Kerry.
 Haskins Bros., Wicklow.
 Enniscorthy Co-op. Agricultural Society, Ltd.
 Wm. Duggan, Carrick-on-Suir, Co. Tipperary.
 Wm. Hoyne, Thomastown, Co. Kilkenny.
 Reys. J. Nolan, Main St., Graignenamanagh, Co. Kilkenny.

GLASNEVIN SUCCESS III.

Superintendent, Agricultural School, Ballyhaise, Co. Cavan.
 Superintendent, Agricultural School, Clonakilty, Co. Cork.
 D. J. Bergin, 29-30 Smithfield, Dublin.
 B. McCaul, Main Street, Carrickmacross.
 J. H. Bennett, Ltd., Ballinacurra, Co. Cork.
 T. McKenzie & Sons, Ltd., 212 Pearse St., Dublin.
 Minch. Norton & Co., Ltd., 10 Westmoreland Street, Dublin.
 Wm. Hoyne, Thomastown, Co. Kilkenny.
 E. Dowley, Carrick-on-Suir, Co. Tipperary.
 Enniscorthy Co-op. Agricultural Society, Ltd.
 M. Kelleher & Sons, Ltd., Tralee, Co. Kerry.
 D. E. Williams, Ltd., Tullamore, Offaly.
 Suttons, Ltd., Cork.
 W. Drummond & Sons, Dawson St., Dublin.
 P. Cluskey, Manfieldstown, Castlebellingham, Co. Louth.

The Albert Agricultural College co-operated with the Department in the working of the foregoing scheme, and approximately 32 barrels of Glasnevin

Sonas and 22 barrels of Sonas Marvellous were distributed by the College to the following growers :—

GLASNEVIN SONAS.

Ml. Quinlan, Bridge House, Knockaney, Bruff, Co. Limerick.
 Patrick Bligh, Dunlever. Trim. Co. Meath.
 P. J. O'Donovan, Couse, Waterford.
 T. Toole, Brickstown, Ashbourne, Co. Meath.
 P. O'Loan, Agricultural Instructor, Kanturk, Co. Cork.
 B. G. Ussher, Cappagh, Co. Waterford.
 Major R. E. Barrow, Milestown, Castlebellingham, Co. Louth.
 M. Rowan & Co., 51-52 Capel Street, Dublin.
 J. M. Drew, Donacorney, Drogheda, Co. Meath.
 Mrs. Tench, Geraldstown, Santry, Co. Dublin.

SONAS MARVELLOUS.

J. Melrose, Levittstown, Mageney, Co. Kildare.
 Thomas Murphy, Ballybeg, Farranfore, Co. Kerry.
 P. O'Loan, Agricultural Instructor, Kanturk, Co. Cork.
 D. Sherrard, Maryborough, Douglas, Co. Cork.
 Laurence Brady, Drumderg, Virginia, Co. Cavan.
 Oliver J. Shannon, Spring Valley, Summerhill, Enfield, Co. Meath.
 Major E. M. Connolly, Castletown, Celbridge, Co. Kildare.

These pedigree stocks of seed were supplied by the Department to merchants on condition that the latter would undertake to have the seed sown by reliable farmers and that they would agree to purchase the produce where suitable and retain it for seed purposes. In order to facilitate merchants, the Department arranged for the inspection by Agricultural Instructors of the growing crops. Reports received at the end of the season of 1935 indicated that in practically all cases the crops grown from pedigree seed supplied to merchants were passed as likely to be suitable for the production of seed.

THE RASPBERRY BEETLE (*Byturus tomentosus*) AND ITS CONTROL.

By J. CARROLL, M.Sc., D.I.C., A.R.C.Sc.I., N.D.A., Agricultural Zoology
Department, University College, Dublin.

The Raspberry Beetle (*Byturus tomentosus*) is a well known pest of raspberries, loganberries, blackberries and other related berries. It is widely distributed over the continent of Europe, and for a number of years it has been regarded as a pest of great economic importance in Great Britain. In Saorstát Eireann the Raspberry Beetle did not attract serious attention prior to about 1932. It has, however, now become exceedingly prevalent in the Duleek district, Co. Meath (an important raspberry growing district), and as a result extensive damage was caused to the 1933 and 1934 raspberry crops. At the invitation of the Department of Agriculture the writer, in 1934, undertook to study the Raspberry Beetle problem in the Duleek district and to carry out control experiments.

LIFE HISTORY OF THE BEETLE AND DAMAGE CAUSED.

From about the end of April and onwards throughout May, the adult beetles emerge from the soil. The beetles are about one-sixth of an inch long, and when they first emerge they are light brown in colour with a covering of a yellowish pubescence. Later on the beetles change to a darker brown colour and the pubescence becomes greyish. After emergence the beetles go to various flowers on which they feed. They are frequently to be found in hawthorn and apple blossoms, but the damage which they cause to the latter blossoms is seldom of a serious nature. When the blossom buds of raspberries and loganberries appear these may be attacked and bored into, by the adult beetles, while they are still in the unopened condition. Sometimes many buds may be destroyed in this fashion but it is claimed that this type of damage is much less severe in districts where hawthorn is plentiful.

After the flowers of the raspberry and loganberry open, the beetles go into them and feed to some extent on the petals and sexual organs, but it is stated by various observers that the nectar in the blossoms is the chief attraction. After mating, the female beetles lay their eggs in the blossoms, generally after the petals have fallen. The eggs are oval in shape, slightly more than one millimetre in length and of a white creamy colour. They may be attached to stamens or pistils or deposited in the cup of the blossom. The time of egg-laying is influenced somewhat by the time of flowering of raspberries and loganberries, but generally commences about the middle of June. The larvae commence to hatch about ten days after the eggs have been laid and by that time the berries have commenced to swell. The newly-hatched larvae nibble for some time at the surface of the

developing berries, generally paying most attention to the basal drupels. As a result, these basal drupels are destroyed and the base of the berry is injured and discoloured. After nibbling at the surface of the berry for some time the larvae bore into its interior where they continue to feed (mostly in the receptacle or "plug" and surrounding drupels) and grow to maturity. The result is that the berries are "maggoty" and accordingly, in addition to being seriously harmed by the feeding of the larvae, are rendered unfit for sale.

When the larva is fully fed, it leaves the berry and drops or crawls to the ground. It then makes its way into the soil and constructs an earthen cell for itself. In this cell it remains for about five weeks in the larva condition and then changes into a pupa. After about a further five weeks the adult beetle emerges from the pupa but it remains in its earthen cell until the following April or May.

CONTROL.

During recent years much research has been carried out in England with the object of devising a satisfactory control of the pest. As a result of this research it has been well established that the best control is secured by the use of derris powder preparations. During the course of the research in England, the derris preparations were used in two manners, viz.—(1) as a dust applied shortly before the flowers (raspberries and loganberries) have opened in order to kill the adult beetles on the flower buds before they lay their eggs, and (2) as a spray applied after the flowers have opened in order to kill the newly hatched larvae before they enter the interior of the berries. Both methods have given good control, but it appears that the latter method has almost invariably given better control.

It is well known that the efficiency of derris as an insecticide is dependent in greatest degree on its rotenone content. The rotenone content of different samples of derris may vary enormously and hence such samples would be of very unequal value weight for weight as insecticides. The research carried out in England indicated that a derris spray should contain .005 per cent. of rotenone in order to give a satisfactory kill of Raspberry Beetle larvae.

In planning the control experiments at Duleek, the writer was guided largely by the results obtained in England. For a number of reasons it was considered impracticable to test with a sufficient degree of accuracy the efficiency of derris applied as a dust at the flower bud stage. Accordingly, the experiments were confined to testing the efficiency of derris when applied as a spray after the flowers had opened. For the purpose of the tests four different derris preparations were selected :—

- I Derris powder as sold by firm A.
- II Derris powder as sold by firm B.
- III A derris preparation containing a spreader as sold by firm B.
- IV A derris preparation containing a spreader as sold by firm C.

The rotenone content of each of these four samples was determined in the Agricultural Chemistry Department of University College, Dublin, and found to be as follows:—

Sample I—1.07 per cent. of rotenone

..	II—4.05	..	..
..	III—1.10	..	..
..	IV—1.25	..	..

Working on the above figures, it was calculated that to make a spray containing .095 per cent. of rotenone the following amounts (approximately) should be used per barrel (40 gallons) of water.

Powder I—2 lb. per barrel

..	II— $\frac{1}{2}$ lb.	..
..	III—2 lb.	..
..	IV—1 $\frac{1}{2}$ lb.	..

In preparing sprays from these powders it was necessary to add soap to I and II but not necessary to add soap to III and IV. In order to expedite the making of the sprays, liquid soap (coco-nut oil soap) was used with I and II instead of soft soap.

The main experiment was conducted in the raspberry garden of Mr. N. Collier, Duleek. The first spraying was done on June 18th, 1934 (about two weeks after the first blossoms had commenced to open) and the four preparations described above were sprayed on to a number of rows in different sections. As the garden narrowed towards one end 10 rows were sprayed with I, 8 rows with II, 6 rows with III and 5 rows with IV. Each section was of approximately the same area, namely about 250 square yards. A number of rows adjacent to the sprayed area and also a number of rows some distance away were left unsprayed as controls.

The spraying was well done with a knapsack sprayer under the supervision of Mr. Clark, County Instructor in Horticulture (since deceased) and the writer.

On June 27th a second spray was applied to each of the sections under the supervision of Mr. Clark.

On July 25th (when raspberry picking was in progress) the garden was again visited and observations made. It was found that the fruit on all the rows which had been sprayed (irrespective of the spray used) was almost absolutely free from beetle larvae.

As a result of a lengthy examination and after a great quantity of berries had been picked it was estimated that not more than about one per cent. of the berries contained larvae. The fruit on the unsprayed sections was heavily infested with larvae.

In addition to the spraying test in Mr. Collier's garden a certain amount of spraying was also done by Moss Bros. In this case the spray was made from the derris powder No. II (4.05 per cent. rotenone), $\frac{1}{2}$ lb. of the powder and $\frac{1}{2}$ gallon of liquid soap being used per barrel of water. Only one application of the spray was given (on June 20th) and four barrels of the spray were used altogether. Here also excellent control of the raspberry beetle was obtained on the sprayed area but it was possibly not quite so good as it would have been if two sprayings had been done.

The results of the foregoing tests at Duleek confirm the conclusions arrived at in England, namely that the Raspberry Beetle can be successfully controlled by the use of derris. It is obvious that reliance can be placed on the application of derris as a spray after the blossoms have opened and hence it is not proposed to recommend dusting before the blossoms open as an alternative (or even additional) control measure.

While a good control can be secured by one application of spray if properly done at the correct time under favourable weather conditions, it is most desirable that a second spraying should be applied. It is recommended that the first spraying should be done about ten days after the first blossoms have opened and the second about ten days later. The spray should be applied thoroughly, directing the mist upwards most of the time in order that it may get into the blossoms which hang downwards. If the derris used already contains a spreader mixed with it then there is no necessity to add soap when making up the spray. If derris powder alone is used soap must be added. Soft soap is usually recommended, but the operation of making the spray could be expedited by the use of liquid soap if the price of this permitted.

As has been already stated, the amount of derris powder to be used in making up a spray will depend upon the rotenone content of the particular sample. Sufficient must be used to ensure that the spray contains .005 per cent. of rotenone. As a fairly accurate working basis the following amounts should be employed :—

Percentage of rotenone in derris powder or derris powder compound	Amount to use for barrel (40 gallons) of spray
1	2 lb.
2	1 lb.
3	$\frac{2}{3}$ lb.
4	$\frac{1}{2}$ lb.

1935 SPRAYING.

As an outcome of the satisfactory results of the 1934 spraying tests at Duleek the great majority of the raspberry growers in the area sprayed their crops in 1935. The growers collectively entered into a contract with

an insecticide manufacturing firm (firm B already mentioned in this paper) for the supply of a derris preparation containing a spreader and guaranteed to contain not less than 2 per cent. of rotenone. This material was used at the rate of 1 lb. per barrel (40 gallons) of water in making up the spray. Very many of the growers did two sprayings and the number who did not spray was very small.

As a result of this extensive spraying the Raspberry Beetle was very satisfactorily controlled all over the area and consequently the raspberry crop was harvested practically free from larvae. There has been such general satisfaction among the raspberry growers of the Duleek area regarding the efficacy of derris spraying that undoubtedly the practice will become a routine operation.

TOMATO VARIETY TRIAL AT THE ALBERT AGRICULTURAL COLLEGE, GLASNEVIN, 1935.

By G. O. SHERRARD, A.R.C.Sc.L. and J. USHER.

In the autumn of 1933 it was decided to erect a glasshouse at the Albert College for the growing of commercial glasshouse crops. Such a house, it was considered, would be very valuable for the training of students, especially of those who would eventually become County Instructors in Horticulture. It would also be of assistance to the glasshouse industry of the Irish Free State as it would enable experiments in methods of culture, the control of disease, and the testing of varieties to be carried out. Before the house was erected one of the writers was sent on a course to the Oaklands Farm Institute, St. Albans, Herts., where commercial glasshouse culture is specially studied.

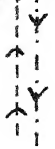
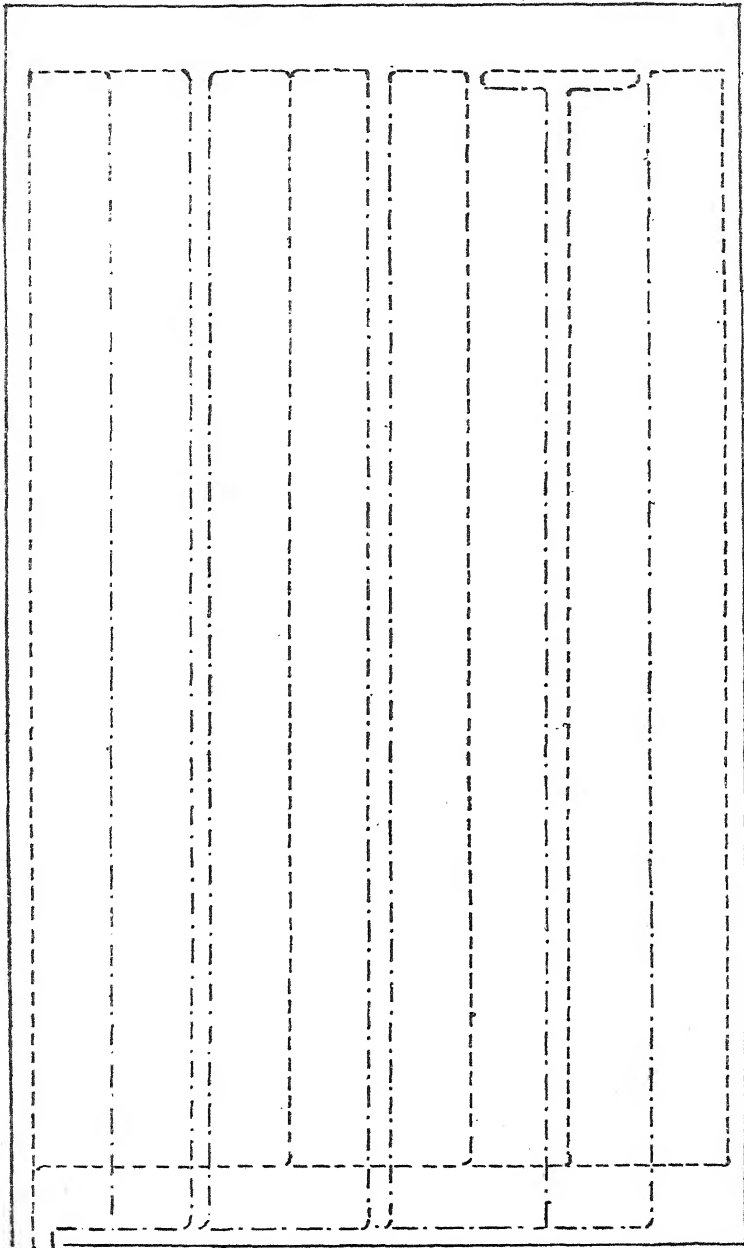
The house was built during 1934, and was ready for use by January, 1935.

HOUSE AND HEATING.

A house of aeroplane type was erected consisting of four sections each 14 ft. wide and 100 ft. long, with the gutters 7 ft. and the ridges 11 ft. above the ground. The sides of the house were formed of cement walls $2\frac{1}{2}$ ft. high surmounted by $4\frac{1}{2}$ ft. of glass. The house was glazed throughout with 24 oz. glass, size 18 x 24 inches. Wooden purlin posts 4 inches square set on concrete dollies served to support the roof. The area covered by the house is approximately $\frac{1}{2}$ -acre (100 x 56 ft.) and the sides run North and South. Heating was provided by a Robin Hood boiler of new F pattern (9 sections) placed in a covered boiler house distant 14 ft. from the glasshouse. It is important, if anthracite is to be used as fuel, that the boiler house should be some little distance from the glasshouse in order to avoid the risk of fumes entering the latter. Pipes 4 inches in diameter were fitted to carry the hot water and arranged as in the plan. They provide a minimum temperature of 60°F. in winter. The fuels used are anthracite and coke, either alone or in combination. The proportion of anthracite to coke is increased in cold weather and decreased when the outside temperature rises. In mild weather coke alone is used.

THE PREPARATION OF THE SOIL.

The soil on the site of the house is a heavy clay loam of stiff, cold character. The formation is a deep boulder clay resting on limestone and the soil is alkaline. The house was built in an orchard which had been kept tilled and had carried fruit and vegetable crops for the previous 30 years. As the site of the house was not level but sloped slightly from N. to S. it was necessary to level it after the house had been built. This was done by adding



Flow Pipes -----

Return Pipes - - - - -

Diameter of all Pipes = 4ins

Size of House = 100ft x 56ft

DIAGRAM OF HEATING CIRCUIT

about 50 loads of fibrous loam taken from a field on the farm. To prepare the soil for planting, it was double dug two spits deep and strawy stable manure was worked into the top spit at the rate of 15 tons per acre. This was carried out at the end of October. Immediately after the ground had been dug a dressing of fertilisers was lightly forked in. This consisted of sulphate of potash 10 cwt. per acre, superphosphate $2\frac{1}{2}$ cwt. per acre, steamed bone flour $2\frac{1}{2}$ cwt. per acre. As soon as the manuring was completed, the house was flooded with water equal in amount to 5 inches of rainfall (about 14,000 gals.). After the flooding, which took place about the middle of November, a catch crop of lettuce was planted.

SOWING.

The tomato seed was sown between the 7th and 12th January in shallow seed boxes measuring $14 \times 8\frac{1}{2} \times 2\frac{1}{2}$ inches. The compost used for seed sowing was made up of 3 parts loam, 1 part leaf-mould and $\frac{1}{2}$ part sand. Two methods of sowing were adopted (1) *spaced sowing* in which the seeds were placed at $1\frac{1}{2}$ inches apart—using 54 seeds to the box, and (2) *broadcast sowing* in which the seeds were scattered at the rate of 200-300 evenly over the surface of the compost so that the average distance between seeds was about $\frac{1}{2}$ inch. The advantage of the spaced method of sowing is that it does away with the necessity for the first pricking off into boxes, so that only one transplanting is made before the plants are put out in their fruiting quarters. Before the seed was sown the boxes were soaked in water to moisten the compost thoroughly, and after sowing they were kept in a heated propagating house with a minimum temperature of 60°F.

PRICKING OFF AND TRANSPLANTING.

The seedlings from the boxes which had been sown broadcast were pricked off between the 29th January and the 2nd February into seed boxes and spaced at $1\frac{1}{2}$ inches apart. Between the 19th and 27th February they were transplanted, some into 4-inch pots and others into deep boxes measuring $23 \times 14\frac{1}{2} \times 4\frac{1}{2}$ inches in which they were spaced at 4 inches apart and planted to the depth of the cotyledons. The compost used in the pots and deep boxes was of the same composition as that of the seed boxes with the addition of a 5-inch pot of steamed bone flour to every bushel of compost. No drainage material was placed in the 4-inch pots, but a layer of old hot bed manure was spread on the bottom of the deep boxes before filling them with compost.

The seedlings from the spaced seed were not pricked off, but transplanted direct either into 4-inch pots or deep boxes, at the same time as this operation was carried out with the unspaced seedlings. All transplanting operations were carried out on a bench erected in the house. The compost was placed in the house 48 hours before use for the purpose of warming it. It is important that plants should not receive a chill at this stage, hence the

necessity for carrying out the operations within the house. Also, a slightly higher temperature is advisable during transplanting and for a few days afterwards.

It was noted that on one night during transplanting the boiler fire accidentally went out and the temperature of the house dropped to 54°F. The result of this was that the batch of plants put in the previous day received a severe check from which they never fully recovered. These plants were subsequently considered not good enough for planting out and were discarded.

PLANTING OUT.

Planting took place between the 4th and the 14th March: the plants in boxes were put out first. The heat had been turned on in the house since the 11th February to warm the soil with the result that at planting time the soil temperature was 62°F. at a depth of 10 inches below the surface. A minimum soil temperature of 57°F. must be obtained before planting can be carried out. Below that temperature tomato roots cease to grow, with the result that the plants get a severe check from which they are slow to recover. The air temperature was maintained at a minimum of 60°F. and was allowed to rise to 75°F. when the sun shone. The house had received no water since it was flooded in November except for an occasional light watering of the lettuce, and no water was given before the tomatoes were planted, the soil being then slightly moist. After the plants were put in they received merely a ball watering. Flooding the house either soon before or soon after planting is considered detrimental to the plants. If the water is cold it chills the soil and if warm it starts succulent growth which is not conducive to early fruiting. The first flooding of the house should not be given until the second truss of flowers has set, or from 6 to 8 weeks after planting.

The spacing of the plants was 1 foot between the plants and 15 inches between the lines, with a distance of 2 feet 6 inches between each pair of lines. Some growers may consider this planting distance too close, but it is the average spacing adopted in the Lea Valley district near London. In the case of a large-leaved variety in fresh soil somewhat more room might be given.

SUBSEQUENT TREATMENT.

The plants made very rapid but not coarse growth. Ball watering was carried out with water at the temperature of the house when the plants were seen to need it. The house received its first flooding on the 16th April, about 3,000 gallons of water being used. Before flooding, a dressing of sulphate of potash at the rate of 5 cwt. per acre was applied. On the 30th April the house was again flooded after the dressing of sulphate of potash had been repeated. By this date the house had received sulphate of potash at the rate of 1 ton per acre. It is claimed for potassic fertilisers that

they build up resistance to disease by inducing firm growth, help to colour the fruit, and in fact have an effect on the plant similar to that of sunlight. The tomato plant requires much potash and very little nitrogen when young, and the reverse when old. Speaking generally, in dull weather more potash should be given and in sunny weather more nitrogen; the sulphate is the best form of potash to use.

On the 16th May a dressing of complete fertilisers was applied, consisting of 1 part sulphate of ammonia, 3 parts superphosphate and 1 part sulphate of potash at the rate of 5 cwts. per acre, after which the house was flooded. This dressing was repeated on the 31st May, 14th June and 28th June. On the 19th July and again on the 2nd August a dressing of $1\frac{1}{2}$ parts of sulphate of ammonia, 3 parts superphosphate and 1 part sulphate of potash was given at the rate of 5 cwt. to the acre. In each case after the application of the manures flooding was carried out. Between the manurial dressings water was given when considered necessary, which entailed flooding the house about once a week.

The plants were supported by winding them round 4 ply fillis stretched between upper and lower horizontal wires. The lower wire was pegged to the ground and the upper stretched along the cross stays of the house. Side shoots were removed from the plants as soon as they were large enough to handle. The plants were not stopped until they had reached the full height allotted to them, which was 1 foot above the top wire. Ventilation was given when the temperature went above 70°F. but only the top ventilators were opened up to the end of May. The weather throughout the summer was bright and sunny with the exception of a cold dull spell early in May and another about the 20th June. Fruit set very well on the first and subsequent flower trusses.

DISEASES AND PESTS.

White fly (*Trialeurodes vaporariorum* Westw.) made its appearance in the house about the middle of April. The Chalcid parasite of the White Fly (*Encarsia formosa* Gahan) was at once introduced and gave good control throughout the season. It is important to introduce the parasite as soon as the White Fly is observed and to maintain the house at a suitable temperature for its increase, i.e. a minimum temperature of 60°F.

Mosaic, a common virus disease of the tomato, was noticed on a few plants of the varieties Stonor's Prolific and E.S. 2 soon after planting. The plants seen to be diseased were removed but some infected plants must have escaped notice as the disease spread rapidly. It was observed that the rate of infection was greater along the outside rows bordering the paths. This was no doubt due to workers brushing against the leaves and so transmitting the disease from plant to plant. The disbudding of the plants was also a potent factor in the spread of the disease. All varieties were infected but E.S. 1 seemed to be more resistant than the other kinds grown. During the first week of May the disease assumed the more virulent "streak" form. Black streaks appeared on the stems, irregular brown

markings on the leaves and yellow blotches on the fruit. The varieties E.S. 2 and Balch's Express showed the streak symptoms to a more marked degree than the other kinds grown. Later in the season the plants grew out of the streak condition but the mosaic effect did not disappear. It is estimated that mosaic disease will reduce the yield of a plant by about 10 per cent., but if mosaic changes to streak and persists in that form much more serious loss of crop may be expected. It does not appear to be known what causes the disease to assume the more dangerous form, but plants making soft luxuriant growth seem to be more affected than harder plants.

The Tomato Leaf Mould (*Cladosporium fulvum*), a very common fungus disease of the tomato, was first noticed on the 24th June, three days after the heat was turned off. It spread rapidly throughout the house. E.S. 2 proved the most susceptible variety, and E.S. 1 the most resistant of those grown. A proprietary spray Shirlan A.G. often gives good control of this disease but in a large house, close planted, efficient wetting of the leaves becomes difficult. The spread of the disease is favoured by low temperature and high humidity. At temperatures above 70°F. the disease does not spread. The outbreak was checked by turning on the heat and increasing the ventilation, and although by September the plants were heavily infected, the crop, being an early one, was not seriously affected.

MARKETING.

The first fruit was picked on the 7th May from the variety Balch's Fillbasket, and regular marketing commenced on the 15th May. Grading and packing were carried out according to the British National Mark standard, 12 lb. boxes measuring 14 x 9 x 5½ inches being used for the sale of the fruit. Seven grades of fruit were sold, under the following categories (the colours refer to the lining paper used in the boxes):—

large pink	..	..	3-6	per lb.
pink	..	..	5-8	..
pink and white	..	..	8-12	..
pink and white crossed	..	..	11-14	..
white	..	..	15-16	..

White crossed, fruit smaller than 16 per lb.; blue, badly shaped and blemished fruits. Four sheets of paper were used, two for the ends and two for the sides; the sheets were cut so that they overlapped at the top, and the top of the box was made of three pieces of board separated sufficiently to allow the paper to be seen. In the case of the pink and white grade, pink side papers and white end papers are used. Pink and white crossed means that one side and one end paper are pink and the other side and end papers white. White crossed has white side and blue end papers.

The prices obtained for the fruit varied from 1/6 per lb. for the highest grade in May to 8d. per lb. for the lowest grade in September. There was little difference in the price realised for the pink or pink and white grades.

For a small grower seven grades are too many, pink and white and pink and white crossed might be combined into a single grade, as also might white and white crossed.

The total crop gathered from the house was 13,397 lb. (almost 6 tons), giving an average per plant of 4.65 lb.

TABLE

Showing Yields and Comparative Earliness of the Varieties Grown.

Variety	No. of Plants	Total Yield in May	Yield per 100 plants in May	Total Yield for Season	Yield per 100 plants for Season
		lb.	lb.	lb.	lb.
Balch's Fillbasket ..	178	20.25	11.3	1056.75	593.6
Stonor's Prolific ..	52	3.45	6.63	278.43	533.4
Stonor's Dessert ..	48	7.12	14.83	256.87	535.2
Stonor's M.P. ..	74	1.18	1.59	361.43	488.4
E.S. 2 ..	1084	121.12	11.17	5211.37	480.7
Balch's Kondine ..	178	37.50	21.06	847.00	475.8
Stonor's Exhibition ..	132	14.00	10.61	627.62	475.4
Balch's Express ..	178	49.50	27.81	804.00	451.1
E.S. 1 ..	956	145.00	15.16	3953.50	413.5

Total yield from the house ($\frac{1}{3}$ ac.), 13,397.0 lb. = 5 tons 19 cwt. 2 qrs. 13 lb.
Yield per acre—48 tons approx.

NOTES ON VARIETIES.

Balch's Kondine.—Average yield per plant 4.75 lbs. The second earliest variety in the trial. Showed a large percentage of badly shaped fruit. Fairly resistant to Cladosporium and Streak. Growth moderately strong.

Balch's Fillbasket.—Average yield per plant 5.93 lbs.; the heaviest cropper in the trial. Produced a considerable number of badly shaped fruits. Showed little resistance to Cladosporium or Streak. Growth medium. Produced a large number of abnormal plants (Christmas trees) which were rogued out of the seed boxes.

Balch's Express.—Average yield per plant 4.51 lbs. Produced more ripe fruit in May than any other variety. Rather a large percentage of badly shaped fruits. Highly susceptible to Streak but not very badly attacked by Cladosporium. Growth short-jointed. Not considered quite as good as Balch's Kondine.

Stonor's M.P..—Average yield per plant 4.88 lbs. Fruit very well shaped and of a characteristic pale green colour before ripening. Fairly resistant to Cladosporium and Streak. Growth medium. The latest variety in the trial, but of good quality.

Stonor's Prolific.—Average yield per plant 5.35 lbs., the second heaviest cropper in the trial, but not early. Fruit of good shape and ripens evenly. Unripe fruit pale green, but darker than Stonor's M.P. Showed some resistance to Cladosporium. Growth strong and leaves large.

Stonor's Dessert.—Average yield per plant 5.35 lbs., the same as Stonor's Prolific, which it closely resembles. Shape good and ripens evenly. Growth strong and leaves large. Fairly resistant to Cladosporium.

Stonor's Exhibition.—Average yield per plant 4.75 lbs. Shape good and ripens evenly. A late variety. Growth medium. Rather susceptible to Cladosporium. Did very well grown in pots in 1934.

E.S. 1.—Average yield per plant 4.13 lbs. Fruit of very good shape and quality. Highly resistant to Cladosporium. A tall variety which perhaps did not receive quite enough space, hence the low yield. Fairly early.

E.S. 2.—Average yield per plant 4.80 lbs. Fruit of good shape, but not so even in size as E.S. 1. Susceptible to Cladosporium and Streak. A very distinct variety, making a short-jointed small plant suitable for a low house. Its apparent susceptibility to Cladosporium makes one hesitate to recommend this variety for a cold house.

From a single trial it is not possible to arrive at very accurate figures regarding the comparative yield of varieties, especially when disease is present. At the same time, the difference between the yields of the varieties near the top and those near the bottom of the Table is probably significant. Such qualities as earliness, fruit shape, and resistance to disease, can be fairly well assessed in one trial. Speaking generally, the Stonor varieties were later than the Balch kinds, but were of better shape and more even in size. For an early crop the best variety to choose of those tested would be Balch's Kondine. Balch's Express is ruled out on account of its susceptibility to Streak. For total yield, where shape is not an important consideration, Balch's Fillbasket may be commended. For shape and even size of fruit, combined with good cropping power, Stonor's Dessert or Stonor's Prolific might be selected.

The Departments of Plant Pathology and Agricultural Zoology co-operated in the identification and control of diseases and pests throughout the trial, and rendered valuable assistance.

CROWN ROT IN SUGAR BEET.

As a result of investigations conducted in Saorstát Éireann and elsewhere it has recently been established that Crown Rot is associated with a deficiency of available boron in the soil, and in experiments conducted in the Saorstát in 1934, the results of which were published in the Department's Journal, Vol. XXXIII., No. 2, it was demonstrated that the disease could be controlled or its development checked by the addition to the soil of borax, which is a compound of boron.

In order to obtain further information regarding the efficacy of boron compounds in controlling Crown Rot, additional experiments were conducted in 1935. As in the previous season, the trials were conducted under the direct supervision of the Agricultural Instructors, and were carried out at 27 centres in 10 counties. The arrangement of the trial at each centre was as follows: On portion of a field sown with sugar beet, where the disease was known to occur in a previous year, a definite area was marked off and divided into four plots of equal size. Three of the plots were dressed with 14 lb., 21 lb. and 28 lb. per acre, respectively, of commercial granulated borax, and the fourth plot was left untreated as a control. This procedure was adopted at 25 centres. At each of these centres the borax was applied either at the time the seed was sown or shortly afterwards, and in no case later than June 21st.

Further, in order to determine the effect of applying boron compounds to crops of sugar beet already affected with Crown Rot, an additional plot at each of 19 centres where the disease had already made its appearance was dressed with borax at the rate of 28 lb. per acre during the period 16th July to 21st August. At 13 of these centres a further additional plot was, at the same time, dressed with an equivalent quantity of borocalcite, which is another compound of boron.

In order to facilitate the application of the dressings, the borax and borocalcite were mixed with fine dry soil and applied along the top of the drills.

Particulars of the dates of application of the different dressings, the pH value of the soil, and of the results obtained at each centre, are set out in the accompanying table.

Crown Rot did not develop at five centres, 23-27 inclusive, and the average returns from these centres show that applications of borax in increasing quantities produced corresponding increases in yield. On the other hand, the average sugar content was highest in the case of the plots which received no borax; but as an increase in yield of roots is frequently associated with a reduction in sugar content this result is not significant.

At the remaining centres, 3-22 inclusive, Crown Rot made its appearance as usual about mid-July. The disease spread rapidly among the plants on

the control plot and to a lesser extent among the plants in the plot dressed with borax at the rate of 14 lb. per acre. Throughout the season only a very small number of plants on the plot treated with borax at the rate of 21 lb. per acre showed signs of the disease, while the plants on the plot dressed with borax at the rate of 28 lb. per acre were practically free from attack.

The average returns from centres 3-27 inclusive, where borax was applied at the time of sowing the beet crops or very soon afterwards, show that the plots treated with borax gave substantially higher yields of roots and a higher percentage of sugar than the control plot. The results from the 20 centres 3-22 inclusive where Crown Rot made its appearance are even more convincingly in favour of the borax dressing.

Comparing the average returns from the 17 centres 3-19 inclusive, where borax at the rate of 28 lb. per acre was applied to separate plots (*a*) at the time of sowing the seed and (*b*) as a top-dressing when Crown Rot had made its appearance, it will be noted that the late application of borax had a very beneficial effect on the yield and sugar content, but still not so great as was produced by the early application.

The average returns from centres 1-13 where borax and borocalcite in equivalent quantities were applied after the crops were attacked by Crown Rot show that while both dressings were responsible for substantial increases in yield and sugar content, the borax gave a slightly better yield than the borocalcite.

The results of these trials confirm those obtained in 1934, and indicate clearly that Crown Rot in sugar beet can be prevented or its spread checked by the application of a dressing of commercial granulated borax. Accordingly, farmers who are growing beet in areas where the disease is prevalent should adopt the practice of applying borax either directly to the crop or mixed with the artificial manures. The Irish Manure Manufacturers have placed on the market supplies of the standard 4-4-1 sugar beet mixture, in which borax in the proportion of 21 lb. to 9 cwt. of the mixture has been incorporated. Arrangements have also been made whereby farmers who have been in the habit of making up their own mixture will be able to procure borax from merchants who usually stock artificial manures. From 21 to 28 lb. of borax per statute acre may be expected to control Crown Rot. If the borax is being applied with the artificial manures, which is perhaps the most convenient method of application, it should be mixed with the superphosphate or with the potash manure before the sulphate of ammonia is added. Farmers who do not apply borax at the time of sowing the seed, and whose crops may afterwards become affected with Crown Rot, should top-dress such crops with borax as soon as the disease is noticed. To facilitate application the borax should be mixed with dry sand or earth.

It should be remembered that borax in excessive quantity is a plant poison and that a dressing in excess of the maximum quantity of 28 lb. per statute acre used in these trials may depress both yield and sugar content of the crop.

WARBLE FLY — EXPERIMENTS, 1935.

In 1935, experiments for the destruction of Warble Fly grubs were conducted by the Agricultural Instructors at 52 centres in 20 counties.

Two preparations of Derris Root were tested, viz. :—

- (a) "Polvo" manufactured by Messrs. Cooper McDougall and Robertson, which was used as a standard, having been used in previous tests and found satisfactory.
- (b) "Paragad" manufactured by Messrs. Richardson, 49/50 Barrow Street, Dublin.

"Polvo" requires the addition of a "spreader" for successful application. The "spreader" (soft soap) is dissolved in hot water and mixed with the Polvo to form a paste. The paste is then reduced to the required strength by the addition of water.

"Paragad" has a "spreader" incorporated in it, and all that is necessary is to mix the powder with water to form a paste, and reduce to the required strength by the addition of water. The preparation is then ready for use.

The dressings were used at the following strengths :—

"Polvo," $\frac{1}{2}$ lb.	"Paragad," $\frac{1}{2}$ lb.
Soft Soap, $\frac{1}{4}$ lb.	Water, 1 gallon.
Water, 1 gallon.	

The dates of the first application varied at the different centres, depending on the degree of maturity of the grubs, but, generally speaking, the first dressing was given about the last week of March. Dressings were applied at intervals of a month. With few exceptions three applications were sufficient for the complete destruction of all grubs that appeared, and in some cases only two dressings were required.

The number of animals treated was 965, consisting of 648 cows and 317 other cattle.

The total number of grubs which appeared during the tests was 13,891, an average of 14.4 per beast.

On the cattle treated with "Polvo" a total of 6,805 warbles developed, and of this number 6,701 were killed, giving a percentage kill of 98. On the cattle dressed with "Paragad" 7,086 warbles appeared, and of this number 6,868 were killed, giving a 97 per cent. kill.

From the above results it would appear that there is little to choose between the two preparations "Polvo" and "Paragad" as regards efficiency. The majority of the Instructors concerned with these trials favoured "Paragad" owing to the fact that it is easier to prepare, the addition of cold water only being necessary; whereas in the case of "Polvo" soft soap and hot water are required.

The detailed figures are given in the following tables :—

No.	County	Date Borax was applied to Plots I, II and IV	Date Borax and Borocalcite were applied to Plots V and VII	Date of Sowing	Date of Weighing and Sampling	Did Crown Rot Develop?	YIELD OF ROOTS PER STATUTE ACRE (Net Factory Weight)							SUGAR CONTENT OF ROOTS							pH Value of Soil Sample
							Early Application				Late Application			Early Application				Late Application			
							Lb. of Borax per Statute Acre				Lb. per Statute Acre			Lb. of Borax per Statute Acre				Lb. per Statute Acre			
							14 lb. (Plot I)	21 lb. (Plot II)	None (Plot III)	28 lb. (Plot IV)	Borax 28 lb. (Plot V)	Control None (Plot VI)	Boro- calcite* (Plot VII)	14 lb. (Plot I)	21 lb. (Plot II)	None (Plot III)	28 lb. (Plot IV)	Borax 28 lb. (Plot V)	Control None (Plot VI)	Boro- calcite* (Plot VII)	
1	Cork	—	19 July	6 May	6 Nov.	Yes	15 12	6 18	11 8	—	—	—	—	19.0	18.1	18.4	7.8				
2	Kilkenny	—	16 Aug.	5 "	22 "	Yes	9 15	8 2	10 0	—	—	—	—	16.6	16.0	16.4	8.4				
3	Cork	25 May	26 July	13 "	2 "	Yes	13 17	14 0	10 0	14 0	13 3	8 17	12 3	18.1	18.0	16.1	18.6	18.0	14.6	18.5	8.2
4	"	13 "	22 "	7 "	5 "	Yes	16 6	14 2	12 6	17 14	14 18	10 0	12 12	18.5	18.5	16.7	19.2	17.4	14.6	17.8	8.4
5	Galway	29 April	10 "	29 April	5 "	Yes	10 12	11 14	5 5	11 16	10 0	5 1	9 16	18.5	18.8	18.1	18.2	18.0	17.0	18.9	7.7
6	"	3 May	1 Aug.	3 May	6 "	Yes	11 1	11 12	4 18	11 7	10 12	5 0	10 7	18.7	18.9	17.8	17.7	18.4	18.4	18.8	8.4
7	Offaly	18 "	20 "	16 "	14 "	Yes	5 18	7 0	3 8	6 15	5 0	3 0	4 16	17.9	18.1	16.6	18.2	16.8	16.0	16.8	8.5
8	Roscommon	6 "	16 July	3 "	29 Oct.	Yes	14 13	15 7	8 1	14 15	12 5	9 2	11 3	17.5	17.0	15.2	16.7	16.7	16.7	16.8	8.2
9	"	1 "	19 "	1 "	18 Nov.	Yes	9 2	10 4	7 8	11 6	10 2	7 2	9 15	17.5	18.0	16.7	17.1	16.5	16.7	17.3	8.0
10	Carlow	13 "	16 Aug.	13 "	13 Dec.	Yes	8 11	8 6	4 19	9 12	7 2	4 19	9 6	20.1	20.3	16.5	20.5	17.2	16.5	18.8	8.4
11	Kildare	29 April	21 "	29 April	7 Nov.	Yes	10 13	11 7	6 16	11 15	7 10	6 16	6 18	18.6	18.7	14.6	18.8	16.5	14.6	18.8	8.4
12	"	3 May	20 "	3 May	15 "	Yes	9 8	10 5	5 2	10 2	6 3	5 2	5 9	17.9	17.8	14.4	18.5	16.6	14.4	18.2	8.1
13	"	6 "	20 "	6 "	21 "	Yes	12 10	13 4	8 3	13 7	9 3	8 3	8 12	19.1	19.0	17.5	19.2	17.3	17.5	17.0	8.3
14	Ladysmith	11 "	12 "	8 "	20 "	Yes	9 0	9 0	8 12	8 17	8 10	8 8	—	18.5	18.4	17.4	19.0	18.0	18.5	—	8.3
15	"	13 "	20 "	9 "	26 "	Yes	9 14	12 8	10 0	12 13	14 3	9 10	—	18.8	18.7	18.8	19.0	17.9	17.8	—	8.2
16	"	13 "	14 "	11 "	21 "	Yes	10 9	10 1	8 19	10 0	10 18	8 19	—	18.1	18.7	18.2	19.2	18.3	18.2	—	8.3
17	Kilkenny	21 June	13 "	9 "	7 "	Yes	10 1	10 14	8 9	10 12	10 16	8 9	—	17.3	18.0	14.3	17.7	17.4	14.3	—	8.2
18	"	14 "	9 "	5 "	21 "	Yes	9 3	9 0	6 0	8 19	9 4	6 0	—	18.0	18.2	18.4	19.5	20.2	18.4	—	8.3
19	"	14 "	9 "	4 "	6 "	Yes	12 17	13 11	10 13	13 0	12 8	10 13	—	17.2	17.7	17.6	17.4	17.6	17.0	—	8.4
20	Cork	15 May	—	4 "	7 "	Yes	14 0	14 17	12 3	16 0	—	—	—	17.8	17.1	17.0	18.3	—	—	—	8.2
21	Roscommon	6 "	—	4 "	6 "	Yes	12 19	13 8	12 3	13 14	—	—	—	15.6	18.1	18.4	16.2	—	—	—	—
22	Offaly	13 "	—	10 "	7 "	Yes	9 15	10 12	9 0	11 2	—	—	—	18.5	18.0	17.8	17.6	—	—	—	8.5
23	Galway	3 "	—	3 "	21 "	No	13 14	13 10	13 4	13 7	—	—	—	18.5	17.8	18.0	17.3	—	—	—	8.0
24	Louth	20 "	—	1 "	13 Dec.	No	9 16	10 0	10 0	9 15	—	—	—	18.2	18.1	18.7	18.5	—	—	—	5.6
25	Tipperary, N. R.	8 "	—	8 "	18 Nov.	No	13 6	14 7	12 14	14 16	—	—	—	17.7	17.8	18.5	17.9	—	—	—	—
26	"	14 "	—	9 "	20 "	No	11 16	12 12	10 4	12 12	—	—	—	17.8	18.4	18.2	18.8	—	—	—	8.3
27	"	11 "	—	9 "	29 "	No	13 4	14 8	12 13	15 1	—	—	—	18.2	18.1	18.9	18.7	—	—	—	8.3
Average of centres 8-27 where Borax was applied about the time of sowing the seed							11 6	11 16	8 17	12 3	—	—	—	18.2	18.3	17.1	18.3	—	—	—	—
Average of centres 23-27 where Borax was applied about the time of sowing the seed, and where Crown Rot did not develop							12 7	12 13	11 15	13 2	—	—	—	18.5	18.4	18.1	18.8	—	—	—	—
Average of centres 8-22 where Borax was applied about the time of sowing the seed, and where Crown Rot developed							11 1	11 11	8 2	11 18	—	—	—	18.1	18.3	16.6	18.3	—	—	—	—
Average of centres 9-19 where Borax was applied to one set of plots about the time of sowing the seed and to another set of plots as a top-dressing after Crown Rot had appeared							—	—	—	11 11	10 2	7 7	—	—	—	—	18.5	17.8	18.4	—	—
Average of centres 1-13 where Borax and Borocalcite were applied after Crown Rot had appeared							—	—	—	—	10 2	6 16	9 8	—	—	—	—	17.3	15.9	17.3	—

Equivalent to 26 lb. Borax.

the control plot and to a lesser extent among the plants in the plot dressed with borax at the rate of 14 lb. per acre. Throughout the season only a very small number of plants on the plot treated with borax at the rate of 21 lb. per acre showed signs of the disease, while the plants on the plot dressed with borax at the rate of 28 lb. per acre were practically free from attack.

The average returns from centres 3-27 inclusive, where borax was applied at the time of sowing the beet crops or very soon afterwards, show that the plots treated with borax gave substantially higher yields of roots and a higher percentage of sugar than the control plot. The results from the 20 centres 3-22 inclusive where Crown Rot made its appearance are even more convincingly in favour of the borax dressing.

Comparing the average returns from the 17 centres 3-19 inclusive, where borax at the rate of 28 lb. per acre was applied to separate plots (a) at the time of sowing the seed and (b) as a top-dressing when Crown Rot had made its appearance, it will be noted that the late application of borax had a very beneficial effect on the yield and sugar content, but still not so great as was produced by the early application.

The average returns from centres 1-13 where borax and borocalcite in equivalent quantities were applied after the crops were attacked by Crown Rot show that while both dressings were responsible for substantial increases in yield and sugar content, the borax gave a slightly better yield than the borocalcite.

The results of these trials confirm those obtained in 1934, and indicate clearly that Crown Rot in sugar beet can be prevented or its spread checked by the application of a dressing of commercial granulated borax. Accordingly, farmers who are growing beet in areas where the disease is prevalent should adopt the practice of applying borax either directly to the crop or mixed with the artificial manures. The Irish Manure Manufacturers have placed on the market supplies of the standard 4-4-1 sugar beet mixture, in which borax in the proportion of 21 lb. to 9 cwt. of the mixture has been incorporated. Arrangements have also been made whereby farmers who have been in the habit of making up their own mixture will be able to procure borax from merchants who usually stock artificial manures. From 21 to 28 lb. of borax per statute acre may be expected to control Crown Rot. If the borax is being applied with the artificial manures, which is perhaps the most convenient method of application, it should be mixed with the superphosphate or with the potash manure before the sulphate of ammonia is added. Farmers who do not apply borax at the time of sowing the seed, and whose crops may afterwards become affected with Crown Rot, should top-dress such crops with borax as soon as the disease is noticed. To facilitate application the borax should be mixed with dry sand or earth.

It should be remembered that borax in excessive quantity is a plant poison and that a dressing in excess of the maximum quantity of 28 lb. per statute acre used in these trials may depress both yield and sugar content of the crop.

WARBLE FLY — EXPERIMENTS, 1935.

In 1935, experiments for the destruction of Warble Fly grubs were conducted by the Agricultural Instructors at 52 centres in 20 counties.

Two preparations of Derris Root were tested, viz. :—

- (a) "Polvo" manufactured by Messrs. Cooper McDougall and Robertson, which was used as a standard, having been used in previous tests and found satisfactory.
- (b) "Paragad" manufactured by Messrs. Richardson, 49/50 Barrow Street, Dublin.

"Polvo" requires the addition of a "spreader" for successful application. The "spreader" (soft soap) is dissolved in hot water and mixed with the Polvo to form a paste. The paste is then reduced to the required strength by the addition of water.

"Paragad" has a "spreader" incorporated in it, and all that is necessary is to mix the powder with water to form a paste, and reduce to the required strength by the addition of water. The preparation is then ready for use.

The dressings were used at the following strengths :—

"Polvo," $\frac{1}{2}$ lb.	"Paragad," $\frac{1}{2}$ lb.
Soft Soap, $\frac{1}{4}$ lb.	Water, 1 gallon.
Water, 1 gallon.	

The dates of the first application varied at the different centres, depending on the degree of maturity of the grubs, but, generally speaking, the first dressing was given about the last week of March. Dressings were applied at intervals of a month. With few exceptions three applications were sufficient for the complete destruction of all grubs that appeared, and in some cases only two dressings were required.

The number of animals treated was 965, consisting of 648 cows and 317 other cattle.

The total number of grubs which appeared during the tests was 13,891, an average of 14.4 per beast.

On the cattle treated with "Polvo" a total of 6,805 warbles developed, and of this number 6,701 were killed, giving a percentage kill of 98. On the cattle dressed with "Paragad" 7,086 warbles appeared, and of this number 6,868 were killed, giving a 97 per cent. kill.

From the above results it would appear that there is little to choose between the two preparations "Polvo" and "Paragad" as regards efficiency. The majority of the Instructors concerned with these trials favoured "Paragad" owing to the fact that it is easier to prepare, the addition of cold water only being necessary; whereas in the case of "Polvo" soft soap and hot water are required.

The detailed figures are given in the following tables :—

COUNTY	No. and Type of Animal	" POLVO "			" PARAGAD "		
		Total developed	Total killed	% killed	Total developed	Total killed	% killed
Cavan	6 cows	74	74	100			
	6 cows				90	90	100
	6 two-year-olds ..	344	344	100			
	6 two-year-olds ..				318	318	100
Clare East ..	12 yearlings ..	170	170	100			
	1 cow	16	16	100			
	12 yearlings ..				173	170	98
	1 cow				24	24	100 _{per}
Clare West ..	11 cows				225	225	100
	1 bull						
	12 cows	187	187	100			
	12 cows	211	203	96			
Cork Mid. ..	12 cows				284	280	99
	30 cows						
	12 yearlings ..				133	133	100
	13 two-year-olds ..				95	95	100
	1 bull				232	232	100
	30 cows	130	130	100	29	29	100
	12 yearlings ..	106	106	100			
	13 two-year olds ..	202	202	100			
Cork S.E. ..	1 bull	32	32	100			
	12 cows	60	57	95			
	10 yearlings ..	241	241	100			
	4 two-year-olds ..	91	90	99			
	11 cows	51	46	90			
	18 cows				191	186	97
	3 yearlings ..				99	96	97
	4 two-year-olds ..				108	107	99
Cork N.W. ..	9 cows				115	107	93
	12 cows						
	10 cows	269	269	100			
Cork N.E. ..	9 cows	55	47	85			
	9 cows				44	37	84
Cork W. ..	9 cows				123	123	100
	6 two-year-olds ..				110	109	99
	9 yearlings ..				163	163	100
	17 cows	262	261	99.6			
	1 three-year-old ..	16	16	100			
	5 two-year-olds ..	94	94	100			
	1 yearling ..	26	26	100			
Donegal ..	14 cows	179	179	100			
	9 heifers	228	228	100			
	3 bullocks ..	62	62	100			
	15 cows				227	225	99
	9 heifers				329	329	100
	3 bullocks ..				76	76	100

COUNTY	No. and Type of Animal	" POLVO "			" PARAGAD "		
		Total devel- oped	Total killed	% killed	Total devel- oped	Total killed	% killed
Dublin	12 cows				145	144	99
	12 cows	131	130	99			
Galway	4 cows	53	53	100			
	1 two-year-old ..	14	14	100			
	6 yearlings	79	79	100			
	2 cows				24	24	100
	3 two-year-olds ..				70	70	100
	4 yearlings				54	54	100
Kerry South ..	11 cows				44	42	95
	1 bull				21	21	100
	11 cows	47	46	98			
	1 bull	10	10	100			
Kerry North ..	12 cows	82	81	99			
	12 cows				111	106	95
Kildare	16 cows				326	323	99
	16 cows	406	403	99			
Laoighis	14 cows	196	195	99			
	14 cows				216	214	99
Limerick	12 cows	43	43	100			
	12 cows				83	83	100
Longford	12 cows	112	111	99			
	12 cows				103	97	94
Meath	8 cows				99	91	92
	8 cows	101	97	96			
Mayo North ..	3 cows	27	27	100			
	3 two-year-olds ..	26	26	100			
	3 cows				26	26	100
	3 two-year olds ..				21	21	100
Mayo South ..	6 cows				40	39	97.5
	6 cows	43	43	100			
Monaghan	6 two-year-olds ..	95	95	100			
	6 two-year-olds ..				43	41	95
Offaly	12 yearlings	221	207	93.6			
	12 yearlings	211	194	92			
	12 yearlings				175	151	86
	12 yearlings				188	161	85.6
Rosecommon ..	6 two-year-olds ..				74	73	98.6
North	2 yearlings				18	17	94
	2 cows	11	11	100			
	2 two-year olds ..	19	19	100			
	4 yearlings	44	44	100			
Rosecommon ..	20 cows	243	234	96			
South	4 yearlings	53	52	98			
	24 cows				415	407	98
	8 two-year-olds ..				68	67	98
	5 yearlings				46	46	100

COUNTY	No. and Type of Animal	" POLVO "			" PARAGAD "		
		Total devel- oped	Total killed	% killed	Total devel- oped	Total killed	% killed
Sligo	15 cows				182	182	100
	6 heifers				49	49	100
	15 cows	175	175	100			
	6 heifers	55	55	100			
Tipperary North	14 cows	168	168	100			
	14 yearlings	196	196	100			
	4 cows	64	56	87.5			
	4 bullocks	80	68	85			
	4 cows				68	52	76
	4 bullocks				84	60	71
Tipperary South	12 yearlings	385	381	99			
	12 cows				274	268	98
Westmeath ..	24 cows				163	119	73
	6 cows	42	41	98			
Wicklow ..	12 cows	267	267	100			
	12 cows				272	272	100
	TOTAL ..	6805	6701	98.4	7086	6868	96.9

SAORSTÁT ÉIREANN

AN ROINN TALMHAÍOCHTA.

(Department of Agriculture).

NATIONAL EGG-LAYING COMPETITION, 1934-35.

The Twenty-third Egg-laying Competition, conducted by the Department of Agriculture, was held at the Munster Institute, Cork, during a period of forty-eight weeks, beginning on the 7th October, 1934, and ending on the 7th September, 1935. A total of 117 pens, of six pullets each, having satisfactorily fulfilled the required conditions, was accepted.

The Competition was arranged in Sections as follows :—

Section I.—White Wyandotte	.. .. .	25 pens
Section II.—Any sitting breed other than White Wyandotte	.. .. .	31 „
Section III.—Any non-sitting breed	.. .. .	15 „
Section IV.—White Wyandotte (confined to holders of Egg Distribution—hen and duck—Stations in the Irish Free State in 1934)	.. .. .	18 „
Section V.—Any sitting breed other than White Wyandotte (confined to holders of Egg Distribution—hen and duck—Stations in the Irish Free State in 1934)	.. .. .	28 „

Station holders were, as heretofore, allowed to enter a second pen in one of the open Sections on payment of the requisite entry fee.

As in the four previous Competitions, only pullets which were certified by the Veterinary College, Ballsbridge, Dublin, as being free from bacillary white diarrhoea were accepted.

The clause introduced in the Regulations in 1928-29, whereby birds were required to be of specific minimum weights on arrival, was enforced. The following were the prescribed minimum weights for the respective breeds :—

Minimum Weights.	All non-sitting breeds	.. .. .	3½ lb.
	White Wyandottes	.. .. .	4½ lb.
	Rhode Island Reds	.. .. .	4½ lb.
	Plymouth Rocks	.. .. .	5 lb.
	Sussex	.. .. .	5½ lb.
	Any other sitting breed	.. .. .	5½ lb.

Eggs were graded as follows :—

Egg Grades.	Special grade—2 ozs. and over for the first four weeks (7th October to 3rd November, inclusive).
	2½ ozs. and over for the second four weeks (4th November to 1st December, inclusive).
	2¼ ozs. and over throughout the remainder of the competition.
	First grade—1½ ozs. for the first four weeks (7th October to 3rd November, inclusive).
	1½ ozs. for the second four weeks (4th November to 1st December, inclusive).
	2 ozs. during the remainder of the competition.
	Second grade—Eggs which were not more than ¼ oz. less than the weight prescribed for first grade eggs in the same period.

Eggs which weighed less than the weight prescribed for second grade eggs were recorded separately, but were not included in the score total on which awards were based.

Special and first grade eggs were included in the one category for the purpose of awarding prizes.

Egg Size.	As regards egg size, twenty-one pens were disqualified for pro- ducing more than 20 per cent. of second grade eggs. The
	respective percentage of each breed disqualified on this score in each of the eight Tests, since the clause was introduced in the Regulations, is given on Table VI.

Egg Yields.	Making no allowance for deaths, the average number of eggs per pullet was 187.1. The average number of eggs per pullet for which a record for the full 48-week period was available was 198.7.
	(See Table II). One Rhode Island Red pullet did not lay during the Test. The average yield per pullet and the percentage production for each breed during each of the twelve four-weekly periods are given on Tables VIII and IX respectively.

Egg Weights.	The average weight of egg for each of the competing breeds is given on Table V. Only two pens (White Wyandotte) were disqualified for failing to reach the standard weight of 24 ozs. per dozen.
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Eggs under the Prescribed Weight for Second Grade.	The respective number of ungraded eggs laid by pullets of each breed which completed the full 48-week period is given on Table VII.
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Of the 625 pullets which completed the full 48-week period 226, or 36.2 per cent. laid two hundred first grade eggs or over, and not more than 20 per cent. second grade eggs as compared with Copper Rings. 192 in the previous Test. Of these 215 were leg-banded with numbered and sealed copper rings. Copper rings were not awarded to eight pullets which were consistent producers of inferior quality eggs, nor to two other pullets which failed to pass the test for bacillary white diarrhoea at the close of the competition. One White Leghorn pullet which was ill and was killed at the close of the Test also qualified for a copper ring. The rings were distributed as follows :—

1 pen	..	Five copper rings each.
11 pens	..	Four „ „ „
20 „	..	Three „ „ „
36 „	..	Two „ „ „
34 „	..	One „ „ „

A total of 366 birds, representing 58.5 per cent. of the total for the full period, qualified for certificates. Of these, 124 birds (19.8 per cent.) were awarded Special Certificates, 90 birds (14.4 per cent.) First Class Certificates, and 152 birds (24.3 per cent.) Second Class Certificates (*see* Tables XIV. and XV.).

Out of the 702 pullets accepted for the Test, 77 or 10.9 per cent. died.

Although this mortality rate may appear high, it is really much lower than in similar tests elsewhere, and under the conditions obtaining in an egg laying competition mortality on this scale cannot be regarded as abnormal.

The close attention given by most breeders to establishing and maintaining a high degree of constitutional vigour in their flocks is reflected in the large proportion of pens returned at full strength to their owners at the conclusion of the Test. On the other hand, the high percentage of deaths in a limited number of pens shows that some breeders still fail to exercise the necessary care in the selection of breeding stock and in the adoption of measures designed to limit the incidence of disease.

The deaths were confined to 51 pens, viz. :—

2 pens	..	..	..	5 deaths each.
3 „	..	..	..	3 „ „
12 „	..	..	..	2 „ „
34 „	..	..	..	1 death „

Particulars as to the cause of death and the percentage number of deaths for each breed are given on Tables XVI and XVII respectively.

The system of feeding was similar to that of previous Tests. The birds were fed three times daily. The morning feed consisted of half the grain ration given as scratch feed in the litter, the mid-day feed of soft mash, and the evening feed of the remainder of the grain ration fed in troughs. Dry mash was fed *ad lib.* The foods which were generally made up by weight corresponded approximately to the following formulæ for both wet and dry mash:—

4 parts Pollard.
 3 „ Bran.
 2½ „ Maize Meal Mixture.
 ½ part Sussex Ground Oats.
 1 „ Fish Meal.

The grain mixture consisted of equal parts of wheat, oats and cracked maize. Vegetables, roots such as cabbage, kale, turnips and mangels were fed in addition, and also grit and shell. The following quantities of foods were fed:—

Mixed Meals	..	..	39,424	lb.
Cracked Maize	}	..	25,200	..
Oats				
Wheat				
Grit and Shell	..	..	4,592	..

WHITE WYANDOTTES.

In this Section the majority of the birds were well-chosen both as regards general appearance and productive qualities. They were well-developed specimens of their breed, vigorous, of good type, and showed splendid body-size. A marked feature was the very careful selection of birds to ensure as far as possible equality as regards age and appearance, thus eliminating pen-unevenness to a very great extent. Strong eye-colour was exhibited by most of the entries. The low mortality figure in this Section was due to the stamina and general excellent health of the birds.

The egg-yield for the first period was exceptionally good, over 87 per cent. of the birds being in production. Over 12 per cent. were not laying owing to moulting, while a few backward birds had not reached laying standard when the Test commenced. The majority of the birds were in full production by the end of the winter period, and both individual and average records were very satisfactory. The yield was consistent for the full period, resulting in a very creditable figure.

Size of egg compared favourably with former Tests, only three pens being disqualified for producing more than 20 per cent. second grade eggs.

There was an appreciable improvement in quality and colour of egg.

The entries in this Section were more varied both as regards quality and appearance than those in Section I. Some very typical specimens of the breed were represented in a single pen ; others were not well developed, while others again tended to coarseness. In pens so composed the yield records varied correspondingly, and quality and trueness to type were well reflected in the subsequent performances of the pullets.

Early moulting was very prevalent, about 40 per cent. of the birds being affected. In the majority of cases, however, the moult was not excessively prolonged, and the birds having come on to lay, made steady progress to finish with quite good averages.

Size of egg was satisfactory, only five pens being disqualified under Clause 28. Quality and colour of egg was good, but was not so satisfactory as in Section I, a number of the birds producing badly-shaped and badly-shelled eggs.

Comparing these two Sections, it is encouraging to note from the entries that breeders have in general continued their efforts to improve and maintain the type, body-size and general appearance characteristic of the Wyandotte breed. In both Sections the birds attained a high standard, which could only have been brought about by consistent rigorous selection. Were it not for some individuals in Section IV which lacked size, the birds were vigorous and well developed in every respect, with excellent head points and sound eyes. Sufficient attention is not always paid to small eye-defects which frequently lead to grave faults, such as total blindness. Birds with light or defective eyes should never be included in a breeding pen or selected for test.

Size of egg has, on the whole, been successfully maintained. What must be carefully avoided, however, is the tendency to overlook want of stamina and other essential factors necessary in stock birds in endeavouring to attain a high standard in this respect. To allow a bird's good record to outweigh its shortcomings in the matter of constitution and quality of egg produced is a mistake, the serious effects of which will be far-reaching. Birds which lay eggs with any abnormalities of shape or shell should not be used for breeding. Their records for number and size of egg may be excellent ; but there is always the risk that, under the strain of continued production, the reproductive organs will become deranged, almost invariably resulting in the death of the bird, more especially if her powers of resistance are weakened by any constitutional defect.

Pleasing features among the entries were the complete absence of feathered shanks, and to a very great extent of immaturity and pen-unevenness. Haphazard selection is not so common as formerly, and breeders are realising that success depends largely on the right choice of birds for the Test.

SECTION III.

The Section for light breeds showed an increase in entries, 14 pens of White Leghorns and one pen of Black Minorcas being accepted.

White Leghorn With the exception of the latter, which were immature and backward on arrival, the other pens were comprised of well-developed, large-bodied birds, showing plenty of vigour and stamina. They showed a marked tightness of feather, and were good to handle. Eye-colour was excellent.

It is encouraging to note the maintenance of the improvement of type, size and general appearance of this breed, and judging from the entries it would appear that breeders have continued their efforts towards the betterment of their stock.

More than half the number of birds entered were in production at the commencement of the Test, and for the winter period they showed very good records, which clearly demonstrates that the improvement in body-size had not been got at the expense of productive qualities.

Over 32 per cent. of the birds were moulting on arrival, and a number of others, which had apparently been laying for a considerable time previous to despatch, also fell into moult, possibly due to early maturity and changed conditions.

Size and quality of egg produced were excellent, no pen being disqualified under the 20 per cent. rule.

Black Minorca The pen of Black Minorcas was handicapped by the death of one bird. The pen was disqualified for failing to reach the required number of eggs and for producing more than 20 per cent. second grade eggs.

SECTION II.

In this Section 22 pens of Rhode Island Reds, 7 of Light Sussex, one of White Sussex and one of Barred Rocks were entered.

Rhode Island Red. The Rhode Island Reds were, on the whole, splendid specimens of their breed, possessing qualities of good size, type and colour, the latter being particularly good. Only in a few pens was pen uniformity disappointing. While conforming to breed type, individual birds were lacking in body size, or mealy and smutty in appearance, thus spoiling an otherwise good pen.

About 25 per cent. of the birds were moulting at the commencement of the Test, but they steadily came on to production, and in consequence the winter average was very creditable.

Size of egg on the whole was satisfactory, only four pens being disqualified on this score.

The quality of egg was not always as good as it might have been; shape and texture were not quite satisfactory, the colour in some cases was far too light for Rhode Island Red eggs.

In appearance the seven pens of Light Sussex were a particularly well-chosen lot, showing splendid body-size, excellent markings, and conforming in every respect to breed-type. Moulting was prevalent, over 45 per cent. of the birds being affected on arrival. Notwithstanding this, however, their records for the winter period were most satisfactory. On the other hand, size of egg left much to be desired, three out of the seven pens, being disqualified on this score.

In the pen of White Sussex immaturity was very marked. **White Sussex.** Were it not for this handicap, better records would have been reached. Size of egg was not as good as it might have been.

The pen of Barred Rocks possessed all the qualities of good stock birds; they were a nice even lot, well marked and typical of their breed. Size of egg produced was excellent. **Barred Rock.**

SECTION V.

This Section comprised 18 pens of Rhode Island Reds, 5 of Barred Rocks, 4 of Buff Rocks and one of Light Sussex.

As regards colour, type and breed characteristics, the Rhode Island Reds were very satisfactory. Lack of uniformity was noticeable in some cases, two and three immature birds being included in some pens. The inclusion of immature birds was largely responsible for the low egg-yield during the first months of the Test. According as the backward birds were brought on to laying standard there was an appreciable improvement in the egg-yields, but the resulting averages were not as good as in Section II. **Rhode Island Red.**

Size of egg was very good, only two pens being disqualified on this score. Quality and colour of egg in some cases was not satisfactory. One bird did not lay during the Test.

The Buff and Barred Rocks were very pleasing specimens of their breed, colour and markings being very good. In some of the pens immaturity and moulting on arrival resulted in low egg-production during the early stages of the Test. **Buff and Barred Rocks.**

As regards size of egg, two pens were disqualified under the 20 per cent. rule.

The birds in the pen of Light Sussex were well chosen specimens as regards general appearance, being large, well-developed birds with good markings. The number of eggs produced by them was satisfactory, but the pen was handicapped by the death of two birds in the latter part of the Test. **Light Sussex.**

The entries in these two Sections, as a whole, showed an improvement and maintenance of type, characteristics and colour.

TABLE I.

The following Table shows the number of pullets competing, the number of eggs laid, cost of food, return for eggs and gross profit for each of the twenty-three competitions held since 1912/13 :—

Eleven months ended	No. of Pullets	No. of Eggs Laid	Average Number per Bird	Average Value per Bird	Cost of Food per Bird	Average Price of Eggs per doz.	Return per Bird over Cost of Food
31st Aug., 1913	318	38,100	120.1	s. d. 11 2.8	s. d. 5 8	d. 13.05	s. d. 5 6.8
" 1914	282	39,216	139.9	13 3.6	5 8.3	13.77	7 7.3
" 1915	264	39,764	150.6	17 6	7 0.5	13.75	10 5.5
" 1916	294	49,320	169.5	23 0.5	8 11.3	19.53	14 0.7
" 1917	210	36,060	174.6	32 7.2	13 10.7	23.89	18 8.5
" 1918	210	36,106	171.9	47 4	16 6	39.66	30 10.1
" 1919	306	55,124	180.0	53 3.4	20 0	42.59	33 3.4
" 1920	354	65,340	185.98	53 9	19 3.9	41.62	34 5.2
" 1921	288	51,584	179.0	40 9.5	18 7.3	32.79	22 2.2
9th Sept., 1922	342	63,518	185.72	33 8.8	11 10	26.15	21 10
16th " 1923	198	38,519	194.5	27 11.5	12 1	20.75	15 10.5
15th " 1924	342	61,144	178.78	26 6.5	11 1.5	21.37	15 5
15th " 1925	348	63,755	183.2	27 4.9	10 5.2	22.58	16 11.7
15th " 1926	342	65,187	190.4	28 6.1	10 7.8	21.5	17 10.3
16th " 1927	492	93,912	190.88	26 10.7	9 3.6	20.3	17 7.1
16th " 1928	510	95,226	186.7	24 10.9	10 8	19.2	14 2.9
16th " 1929	540	101,820	188.6	28 8.5	11 0.5	21.9	17 8
16th " 1930	588	100,752	171.3	24 4.2	8 5.8	20.5	15 10.4
16th " 1931	588	111,180	189.1	24 4	7 3	18.5	17 1
15th " 1932	600	111,988	186.6	21 3.6	6 4.2	16.4	14 11.4
12th " 1933	606	113,047	186.5	17 11.6	5 1.8	13.9	12 9.8
10th " 1934	606	112,177	185.1	19 5	5 8.9	15.1	13 8.1
7th " 1935	702	131,384	187.1	18 3	6 7.7	14.0	11 7.3

It should be noted that the figures given in Table I above are based on the total number of pullets competing, no allowance having been made in respect of deaths during the test.

Taking the birds which died during the 1934-35 Test into account only up to the date of death, the average number of pullets for the whole period was 671.1, and the average number of eggs per bird 195.8. On this basis the average egg value per bird was 19s. 1.1d., the cost of food per bird 6s. 11.3d., and the return per bird over cost of food 12s. 1.8d.

On Tables II to IV pullets which died during the competition have been eliminated from the calculations and the averages for the remaining birds are given.

TABLE II.

Average Egg Yield from each Breed.

BREED	No. of Pullets for full period	No. of eggs laid	Average No. of eggs per pullet	GRADE AVERAGES PER PULLET		
				Special	First	Second
White Wyandotte ..	230	46,810	203.5	92.7	89.0	21.8
Rhode Island Red ..	218	42,995	197.2	73.7	98.0	25.5
White Leghorn ..	74	15,245	206.0	111.3	85.8	8.9
Light Sussex ..	43	8,231	191.4	61.8	92.1	37.5
Barred Rock ..	31	5,517	178.0	60.7	98.2	19.0
Buff Rock ..	19	3,690	194.2	53.5	103.7	27.0
Black Minorca ..	5	873	174.6	33.6	104.8	36.2
White Sussex ..	5	819	163.8	33.4	87.8	42.6
All Breeds ..	625	124,180	198.7	82.4	93.0	23.3

TABLE III.

Number and Percentage of Special, First, and Second Grade Eggs for each Breed in respect of Pullets which completed the full 48-week Period.

BREED	EGGS LAID			PERCENTAGE DISTRIBUTION		
	Special Grade	First Grade	Second Grade	Special Grade	First Grade	Second Grade
White Wyandotte ..	21,323	20,467	5,020	% 45.6	% 43.7	% 10.7
Rhode Island Red ..	16,039	21,366	5,570	37.3	49.7	13.0
White Leghorn ..	8,237	6,846	662	54.0	41.6	4.4
Light Sussex ..	2,656	3,963	1,612	32.3	48.1	19.6
Barred Rock ..	1,883	3,040	588	34.1	53.2	10.7
Buff Rock ..	1,016	1,970	704	27.5	53.4	19.1
Black Minorca ..	168	524	181	19.3	60.0	20.7
White Sussex ..	167	489	213	20.4	53.6	26.0
All Breeds ..	51,509	58,121	14,550	41.5	46.8	11.7

TABLE IV.

Number and Percentage of Pullets of each Breed which laid 200 First Grade Eggs and over, and not more than twenty per cent. Second Grade.

BREED	Number of Pullets for Full Period	Number of Pullets which laid 200 First Grade Eggs and over	Percentage of Pullets which laid 200 First Grade Eggs and over
White Wyandotte	230	97	42.2
Rhode Island Red	218	69	31.6
White Leghorn	74	34	45.9
Light Sussex	43	13	30.2
Barred Rock	31	6	19.3
Buff Rock	19	6	31.6
Black Minorca	5	1	20.0
White Sussex	5	—	—
All Breeds	625	226	36.2

In addition to the 226 pullets mentioned in above Table, one Barred Rock pullet which died during the Test laid 200 first grade eggs and over, and not more than 20 per cent. second grade.

TABLE V.

Average Weight of Egg for each Breed.

BREED	Total Number of Eggs Laid	Total Weight of Eggs	Average Weight of Egg	Average Weight Per Dozen
		<i>lb. oz. dr.</i>	<i>oz. dr.</i>	<i>oz.</i>
White Wyandotte ..	49,870	6,729 13 12	2 2.5	25.9
Rhode Island Red ..	44,848	5,990 1 11	2 2.2	25.6
White Leghorn ..	16,167	2,231 11 12	2 3.3	26.5
Light Sussex ..	8,607	1,129 7 4	2 1.2	25.2
Barred Rock ..	6,160	823 10 3	2 2.2	25.7
Buff Rock ..	4,019	526 10 3	2 1.5	25.2
Black Minorca ..	873	113 7 8	2 1.3	24.9
White Sussex ..	840	107 7 13	2 0.7	24.6
All Breeds ..	131,384	17,652 6 2	2 2.4	25.8

TABLE VI.

Percentage number of pens of each breed which were disqualified for producing more than 20 per cent. of Second Grade eggs in each of the eight Tests, since the clause was introduced in the Regulations.

BREED	PERCENTAGE OF PENS DISQUALIFIED							
	1927-8	1928-9	1929-30	1930-31	1931-2	1932-3	1933-4	1934-5
White Leghorn ..	38.8	19.0	45.0	40.0	15.8	—	—	—
White Wyandotte ..	54.8	35.3	47.2	22.8	—	11.1	4.4	18.6
Rhode Island Red ..	40.9	25.0	40.0	35.7	—	7.1	12.9	15.0
Buff Rock ..	—	—	14.3	28.5	—	—	33.3	25.0
Barred Rock ..	*	50.0	33.3	50.0	25.0	33.3	33.3	16.7
Light Sussex ..	50.0	33.3	25.0	60.0	—	—	16.7	37.5
Black Minorca ..	—	—	—	—	—	*	*	100.0
Australorp ..	100.0	—	—	*	*	*	*	*
Black Leghorn ..	—	*	*	*	*	*	*	*
Black La Bresse ..	100.0	*	*	*	*	*	*	*
Average ..	44.7	26.6	39.8	32.6	4.0	7.9	10.9	17.9

* Breed not competing.

TABLE VII.

Eggs under the prescribed weight for Second Grade.

BREED						Number of Pullets for full period which laid ungraded eggs	Number of ungraded eggs
White Wyandotte ..	..	..	..	..	..	39	81
Rhode Island Red ..	..	..	..	..	..	31	79
White Leghorn ..	..	..	..	..	..	6	8
Light Sussex ..	..	..	..	..	..	10	57
Barred Rock ..	..	..	..	..	..	6	10
Buff Rock ..	..	..	..	..	..	2	3
Black Minorca ..	..	..	..	..	..	—	—
White Sussex ..	..	..	..	..	..	1	2
TOTAL ..	..	..	..	..	..	95	240

TABLE VIII.

Average Egg Yield per Pullet during each of the Twelve Four-Weekly Periods.

Breed	Number of Pullets for full period	Oct. 7-Nov. 3	Nov. 4-Dec. 1	Dec. 2-Dec. 29	Dec. 30-Jan. 26	Jan. 27-Feb. 23	Feb. 24-Mar. 23	Mar. 24-Apr. 20	Apr. 21-May 18	May 19-June 15	June 16-July 13	July 14-Aug. 10	Aug. 11-Sept. 7	Average for full period
White Wyandotte	230	14.6	17.4	18.2	18.2	17.8	19.1	20.0	18.7	17.2	15.2	13.5	13.3	203.5
Rhode Island Red	218	12.4	14.7	16.2	16.7	15.4	18.3	21.0	20.1	17.2	16.5	14.8	13.1	197.2
White Leghorn	74	14.8	16.3	16.1	15.1	14.2	18.3	21.0	21.5	20.3	18.3	16.3	13.2	206.0
Light Sussex	48	15.6	15.3	16.4	16.1	14.9	18.5	20.7	17.5	15.9	14.2	14.3	11.5	191.4
Barred Rock	31	10.4	9.6	13.8	14.7	13.4	17.2	20.3	19.0	16.4	15.1	15.4	12.1	175.0
Buff Rock	10	13.7	17.2	16.2	18.2	17.3	18.9	19.3	19.2	15.5	13.7	13.5	11.3	194.2
Black Minorca	5	4.2	14.3	13.0	15.6	13.4	16.8	19.3	21.2	17.6	16.0	13.2	8.6	174.6
White Sussex	5	12.2	15.6	12.4	8.4	11.2	18.4	17.3	18.3	15.8	9.6	14.0	9.8	163.8
All Breeds	625	13.6	15.8	16.8	16.9	16.0	18.6	20.0	19.5	17.0	15.0	14.5	12.9	198.7

TABLE IX.

Percentage Production for each Breed during each of the Twelve Four-Weekly Periods.

Breed	Number of Pullets for full period	Oct. 7-Nov. 3	Nov. 4-Dec. 1	Dec. 2-Dec. 29	Dec. 30-Jan. 26	Jan. 27-Feb. 23	Feb. 24-Mar. 23	Mar. 24-Apr. 20	Apr. 21-May 18	May 19-June 15	June 16-July 13	July 14-Aug. 10	Aug. 11-Sept. 7
White Wyandotte	230	7.2	8.5	8.9	9.0	9.1	9.4	9.9	9.2	8.5	7.5	6.5	6.5
Rhode Island Red	218	6.3	7.5	7.9	8.5	7.3	8.3	10.7	10.5	9.0	8.5	7.5	6.5
White Leghorn	74	7.7	7.9	7.9	7.4	6.3	8.0	10.3	10.5	9.2	8.5	7.5	6.5
Light Sussex	48	7.7	7.2	8.6	8.4	7.3	9.7	10.8	9.5	8.5	7.5	6.5	6.5
Barred Rock	31	6.3	5.4	7.7	8.2	7.5	9.7	11.4	10.7	9.2	8.5	7.5	6.5
Buff Rock	10	7.0	8.8	9.4	9.4	8.0	9.7	10.0	9.4	8.0	7.5	6.5	6.5
Black Minorca	5	2.2	9.1	7.5	8.9	7.7	9.6	11.3	12.1	10.1	9.3	7.5	6.5
White Sussex	5	7.5	9.5	7.6	5.1	6.8	11.5	10.5	11.5	9.5	5.0	5.6	6.0
All Breeds	625	6.9	7.9	8.4	8.5	8.1	9.3	10.4	9.8	8.9	8.0	7.3	6.5

NOTE.—Eggs which were under the weight prescribed for second grade are not included in the calculations in Tables VIII and IX above.

TABLE X.

Average Number of First Grade Eggs per Pullet during the period 7th October to 6th January, inclusive (92 days).

BREED	Number of Pullets	Number of First Grade Eggs	Average Number of First Grade Eggs per Pullet
White Wyandotte	257	11,283	43.9
Rhode Island Red	239	9,673	40.5
White Leghorn	82	3,718	45.3
Light Sussex	47	1,757	37.4
Barred Rock	36	1,181	32.8
Buff Rock	22	835	38.9
Black Minorca	6	99	16.5
White Sussex	6	120	20.0
All Breeds	695	28,688	41.3

TABLE XI.

Pullets classified according to the number of First Grade Eggs laid from 7th October to 6th January, inclusive (92 days).

BREED	Number of Pullets	Pullets not laying up to 9th Jan.	FIRST GRADE EGGS					
			Under 30	30 and under 40	40 and under 60	60 and under 70	70 and under 80	80 and over
White Wyandotte ...	257	7	53	29	95	49	24	—
Rhode Island Red ...	239	3	70	38	84	30	14	—
White Leghorn ...	82	—	17	14	30	19	2	—
Light Sussex ...	47	1	19	2	13	12	—	—
Barred Rock ...	36	1	16	7	9	2	1	—
Buff Rock ...	22	—	6	6	9	1	—	—
Black Minorca ...	6	1	3	2	—	—	—	—
White Sussex ...	6	—	4	2	—	—	—	—
All Breeds ...	695	13	183	100	240	113	41	—

TABLE XII.

Percentage Distribution of Pullets of each Breed according to the number of First Grade Eggs laid from 7th October to 6th January, inclusive (92 days).

BREED	Pullets not laying up to 9th Jan.	FIRST GRADE EGGS					
		Under 30	30 and under 40	40 and under 60	60 and under 70	70 and under 80	80 and over
White Wyandotte	2.7	20.6	11.3	37.0	19.1	9.3	—
Rhode Island Red	1.2	29.3	15.9	35.1	12.5	6.0	—
White Leghorn	—	20.7	17.1	36.6	23.2	2.4	—
Light Sussex	2.1	40.4	4.3	27.7	25.5	—	—
Barred Rock	2.8	44.4	19.4	25.0	5.6	2.8	—
Buff Rock	—	27.3	27.3	40.9	4.5	—	—
Black Minorca	16.7	50.0	33.3	—	—	—	—
White Sussex	—	66.7	33.3	—	—	—	—
All Breeds	1.8	27.1	14.4	34.5	16.3	5.9	—

The entries in the Test under review were very satisfactory. With the exception of the winning pen no outstanding scores were recorded, but a good steady average was maintained throughout.

At the close of the Competition all birds were blood-tested for bacillary white diarrhoea, and it is pleasing to note that only three birds reacted to the test.

Breeders are again reminded that the ill-effects of haphazard selection and improper management previous to despatch invariably result in the prevalence of such faults as lack of pen uniformity, immaturity, early moulting and poor quality of egg. Breeding without selection leads to failure, and sending badly-chosen birds to Test can only have the same result.

The merits of each bird as regards characteristics of type and body-size, stamina, constitutional soundness, and quality of egg, should be carefully examined, and a bird lacking in any one of these qualities should not be included in a breeding pen. Commonsense, acute observation and avoidance of extremes are the surest guides in the selection of stock birds. Exhaustive culling from the day the chicks are hatched should be practised to ensure that only the pick of the flock remains from which to make the final choice. This selection should be made on a basis of body-size, type, head points, development, condition and stamina.

Faults such as light or defective eyes and feathered shanks should not be disregarded.

Activity is a sure sign of health; therefore, the actions of the birds should be carefully watched for vigour and vitality. When the birds come on to production, shape, colour and texture of egg should be examined, and unless these are normal the birds should not be selected.

When the final selection is to be made, choose as far as possible birds similar in age, appearance and productive qualities, true to the type of its breed, in a good physical condition, and with promising plumage.

The management prior to despatch is most important : consequently, the birds selected should be removed from the flock and kept under test conditions as far as possible. Carefully examine for lice and scaly leg, and if necessary treat with a light dressing of mercurial ointment for the former and sulphur ointment for the latter.

The selected entries should be despatched in a strong, roomy, well-ventilated hamper or box, suitably lined to protect them from cold during transit.

SECTION PRIZES.
SECTION I.—WHITE WYANDOTTE.

NAME AND ADDRESS OF OWNER	Total No. of Eggs Laid	No. of Second Grade Eggs	Value of Eggs	Average No. of Eggs per Bird
<i>First Prize (£10).</i> Miss B. Quinn, Anglesboro', Mitchelstown, Co. Cork.	1,509	214	£ s. d. 7 6 10½	251.5
<i>Second Prize (£7).</i> Mrs. M. Connolly, Carrigamore, Corvalley, Co. Monaghan.	1,350	6	6 17 11½	226.5
<i>Third Prize (£5).</i> Miss P. Alley, Hill Poultry Farm, Athboy, Co. Meath.	1,365	224	6 16 8½	227.5
<i>Fourth Prize (£4).</i> Mrs. L. P. Cox, Victoria Park, Donnyearney, Co. Dublin.	1,280	53	6 12 9½	213.3
<i>Fifth Prize (£2).</i> Mr. W. Frazer, Twigs Park, Manorhamilton, Co. Leitrim.	1,298	53	6 12 3½	216.3

SECTION II.—ANY SITTING BREED OTHER THAN WHITE WYANDOTTE.

NAME AND ADDRESS OF OWNER	Breed	Total No. of Eggs Laid	No. of Second Grade Eggs	Value of Eggs	Average No. of Eggs per Bird
<i>First Prize (£10).</i> Mrs. E. Hornidge, Tulfarris P. F., Blessington, Co. Wicklow.	Rhode Island Red	1,345	169	£ s. d. 6 8 10½	224.2
<i>Second Prize (£7).</i> Captain H. M. S. Redmond, Popefield, Athy, Laoighis.	Rhode Island Red	1,285	168	6 5 3	214.2
<i>Third Prize (£5).</i> Mrs. D. C. Chearnley, Salterbridge P. F., The Deeps, Wexford.	Rhode Island Red	1,247	202	6 2 8½	207.8
<i>Fourth Prize (£4).</i> Mrs. M. G. King, Beech Grove, Donadea, Co. Kildare.	Rhode Island Red	1,225	110	6 0 4	204.2
<i>Fifth Prize (£2).</i> Mrs. K. Earl, Grantstown House, Waterford.	Rhode Island Red	1,228	207	5 18 8	204.7

SECTION III.—ANY NON-SITTING BREED.

NAME AND ADDRESS OF OWNER	Breed	Total No. of Eggs Laid	No. of Second Grade Eggs	Value of Eggs	Average No. of Eggs per Bird
<i>First Prize (£10).</i> Miss K. Cunningham, Monreade P. F., Naas, Co. Kildare.	White Leghorn	1,387	40	£ s. d. 6 12 5	231.2
<i>Second Prize (£7).</i> Miss S. M. Olden, Rockgrove P. F., Ring, Clonakilty, Co. Cork.	White Leghorn	1,336	48	6 11 8	222.7
<i>Third Prize (£5).</i> Rev. Bro. Bergin, Our Lady of Lourdes, Cahermoyle, Ardagh, Co. Limerick.	White Leghorn	1,333	26	6 11 4½	222.2

SECTION IV.—WHITE WYANDOTTE. STATION HOLDERS.

NAME AND ADDRESS OF OWNER	Total No. of Eggs Laid	No. of Second Grade Eggs	Value of Eggs	Average No. of Eggs per Bird
<i>First Prize (£10).</i> Mrs. M. Lynch, Knockroe, Passage East, Co. Waterford.	1,239	11	£ s. d. 6 8 10½	206.5
<i>Second Prize (£7).</i> Mrs. R. B. Eadie, The Poplars, Beaufort, Co. Kerry.	1,325	167	6 8 9½	220.8
<i>Third Prize (£5).</i> Miss M. Byrne, Montevideo, Roscrea, Co. Tipperary.	1,234	81	6 5 4½	205.7
<i>Fourth Prize (£4).</i> Miss K. Newman, Drinadaly, Trim, Co. Meath.	1,241	175	5 18 10½	206.8

SECTION V.—ANY SITTING BREED OTHER THAN WHITE WYANDOTTE.
STATION HOLDERS.

NAME AND ADDRESS OF OWNER	Breed	Total No. of Eggs Laid	No. of Second Grade Eggs	Value of Eggs	Average No. of Eggs per Bird
<i>First Prize (£10).</i> Mrs. E. Loughrey, Drumanna, Cusheen, Ennis, Co. Clare.	Rhode Island Red	1,289	18	£ s. d. 6 3 4½	214.8
<i>Second Prize (£7).</i> Mrs. E. M. O'Flynn, Prohurst, Milford, Charleville, Co. Cork.	Rhode Island Red	1,219	117	5 19 3	203.2
<i>Third Prize (£5).</i> Mrs. M. Cruite, Tulla, Three Castles, Co. Kilkenny.	Rhode Island Red	1,171	111	5 15 2½	195.2
<i>Fourth Prize (£4).</i> Mrs. M. Molyneux, The Decoy, Dunlavin, Co. Wicklow.	Rhode Island Red	1,180	112	5 14 10½	196.7
<i>Fifth Prize (£2).</i> Mrs. O. McKenna, Doaghys, Glasslough, Co. Monaghan.	Rhode Island Red	1,117	58	5 13 11½	186.2

SPECIAL PRIZES.

The Special Prize of a Silver Cup (or its value, £10) for the *Pen* of pullets laying eggs of the highest market value during the Competition has been awarded to Miss B. Quain, Anglesboro', Mitchelstown, Co. Cork, for Pen No. 20 (White Wyandotte), which laid 1,509 eggs, value £7 6s. 10½d., and which also won first prize in Section I.

The Special Prize of a Silver Medal (or its value, £2) for the *Pen* of pullets (non-sitting breed) laying the highest average of first grade eggs per bird during the period 7th October to 6th January, inclusive, has been awarded to Miss E. M. O'Keefe, St. Rita's Poultry Station, Lake Vale, Ballydesmond, Co. Cork, for Pen No. 66 (White Leghorn), which laid 354 first grade eggs.

The Special Prize of a Silver Medal (or its value, £2) for the *Pen* of pullets (sitting breed) laying the highest average of first grade eggs per bird during the period 7th October to 6th January, inclusive, has been awarded to Mrs. E. Hornidge, Tulfarris Poultry Farm, Blessington, Co. Wicklow, for Pen No. 13 (White Wyandotte), which laid 401 first grade eggs.

The Special Prize of a Silver Medal (or its value, £2) for the *Individual Bird* (non-sitting breed) laying the highest number of first grade eggs during the Competition has been awarded to Mrs. E. Hornidge, Tulfarris Poultry Farm, Blessington, Co. Wicklow, for Pullet No. 378 (Pen No. 63, White Leghorn), which laid 256 first grade eggs.

The Special Prize of a Silver Medal (or its value, £2) for the *Individual Bird* (sitting breed) laying the highest number of first grade eggs during the Competition has been awarded to Mrs. L. P. Cox, Victoria Park, Donnycarney, Co. Dublin, for Pullet No. 43 (Pen 8, White Wyandotte), which laid 275 first grade eggs.

The Special Prize of a Silver Medal (or its value, £2) for the *Individual Bird* (non-sitting breed) laying the highest number of first grade eggs during the period 7th October to 6th January, inclusive, has been awarded to Miss A. Fitzgerald, Ardgoul, Rathkeale, Co. Limerick, for Pullet No. 355 (Pen No. 61, White Leghorn), which laid 73 first grade eggs.

For the Special Prize of a Silver Medal (or its value, £2) for the *Individual Bird* (sitting breed) laying the highest number of first grade eggs during the period 7th October to 6th January, inclusive, the undermentioned three pullets laid 79 first grade eggs each :—

Pullet No. 747 (Pen 25, White Wyandotte), owned by Mrs. L. P. Cox,
Victoria Park, Donnycarney, Co. Dublin.

Pullet No. 492 (Pen 83, White Wyandotte), owned by Mrs. M. Lynch,
Knockroe, Passage East, Co. Waterford.

Pullet No. 578 (Pen 98, Rhode Island Red), owned by Mrs. M. Cruite,
Tulla, Three Castles, Co. Kilkenny.

The value of the prize has, therefore, been divided between the three respective owners.

PULLETS WHICH QUALIFIED FOR COPPER RINGS.

The following Table gives particulars of the 195 pullets which laid 200 first grade eggs or over, and not more than 20 per cent. second grade.

TABLE XIII.
WHITE WYANDOTTE (94 Pullets).

Pen Number	Pullet Number	Number of Sealed Copper Ring	EGGS LAID				OWNER
			Special Grade	First Grade	Second Grade	Total	
1	1	1146	76	170	12	258	Miss P. Alley, Hill Poultry Farm, Athboy, Co. Meath.
	4	1145	66	152	16	234	
	5	1147	146	70	12	228	
2	9	1148	174	35	5	214	Mrs. W. D. Baker, Whitehall Towers, Rathfarnham, Co. Dublin.
3	13	1149	218	7	—	225	Rev. Bro. Bergin, Our Lady of Lourdes, Cahermoyle, Ardagh, Co. Limerick.
	15	1150	218	14	—	232	
4	19	1151	192	42	—	234	Mrs. J. R. Boyd. The Rectory. Killaloe, Co. Clare.
	20	1152	15	190	16	221	
	23	1153	138	71	—	209	
	24	1154	197	21	1	219	
5	25	1155	154	61	—	215	Miss P. Brady, Newtowngirley, Ceanannus Mor, Co. Meath.
	26	1156	161	73	—	234	
	29	1157	140	92	2	234	
6	35	1158	98	138	8	244	Mrs. C. P. Chearnley, Glendoneen, Ballinhassig, Co. Cork.
	36	1159	39	200	5	244	
7	37	1160	58	195	4	257	Mrs. M. Connolly, Corvalley, Co. Monaghan.
	38	1161	137	109	—	246	
	39	1162	93	163	2	258	
	42	1327	210	10	—	220	
8	43	1163	49	226	6	281	Mrs. L. P. Cox, Victoria Park, Donnycarney, Co. Dublin.
	44	1164	52	175	4	231	
9	53	1165	142	59	3	204	Mrs. R. Croasdaile, Rynn, Rosenallis, Mountmellick, Laoighis.
	54	1166	13	188	35	236	

Pen Number	Pullet Number	Number of Sealed Copper Ring	EGGS LAID				OWNER
			Special Grade	First Grade	Second Grade	Total	
10	55	1167	204	5	—	209	Mrs. M. Deegan, Roadside Poultry Farm, Freshford, Co. Kilkenny.
11	61	1168	51	174	8	233	Mr. W. Fraser, Twigs Park, Manorhamilton, Co. Leitrim.
	62	1169	148	63	6	217	
	64	1170	238	9	—	247	
	66	1171	216	3	—	219	
13	74	1172	185	30	—	215	Mrs. E. Hornidge, Tulfarris Poultry Farm, Blessington, Co. Wicklow.
	75	1173	212	48	—	260	
	76	1174	119	113	4	236	
	77	1175	146	67	—	213	
	78	1176	141	78	3	222	
14	80	1177	174	54	5	233	Mr. W. F. Lawrence, Clonminch P. F., Tullamore, Offaly.
	81	1178	36	180	11	227	
	83	1179	165	80	2	247	
15	85	1180	166	47	3	216	Mrs. N. McElligott, Bedford, Listowel, Co. Kerry.
	89	1181	201	13	1	215	
	90	1182	186	36	1	223	
16	92	1183	153	87	4	244	Mrs. R. Murphy, Newrath, Waterford.
	95	1184	25	193	32	250	
17	97	1185	13	192	8	213	Mrs. M. O'Donnell, Porthall, Clonleigh, Lifford, Co. Donegal.
18	106	1186	127	77	1	205	Mrs. E. M. O'Hara, Mornington, Crookedwood, Co. Westmeath.
19	110	1187	192	31	2	225	Miss F. H. Powell, Crouenstown, Delvin, Co. Westmeath.
	114	1188	182	37	1	220	
20	117	1189	192	76	3	271	Miss B. Quain, Anglesboro', Mitchelstown, Co. Cork.
	118	1190	154	92	6	252	
	119	1191	36	174	33	243	
	120	1192	24	199	38	261	

Pen Number	Pullet Number	Number of Sealed Copper Ring	EGGS LAID				OWNER
			Special Grade	First Grade	Second Grade	Total	
21	123	1193	185	25	1	211	Mrs. M. Stanton, Woodlands, Glammire, Co. Cork.
	126	1194	25	196	38	259	
22	733	1195	26	184	30	240	Mrs. R. Murphy, Newrath, Waterford.
	735	1196	170	59	19	248	
	736	1197	60	148	18	226	
23	133	1198	151	73	—	224	Miss A. G. Twigg, Greenwood, Malahide, Co. Dublin.
	135	1199	209	46	—	255	
	136	1200	202	9	—	211	
	137	1201	222	38	1	261	
24	142	1202	45	137	5	207	Miss P. White, Gortnafluir P. F., Clonmel, Co. Tipperary.
25	747	1203	127	107	1	235	Mrs. L. P. Cox, Victoria Park, Donnycarney, Co. Dublin.
	748	1204	106	116	13	235	
	749	1205	201	68	1	270	
73	429	1253	91	110	4	205	Miss M. M. Bowe, Graigueavalla, Errill, Ballybrophy, Laoighis.
74	435	1254	54	151	6	211	Miss M. Byrne, Montevideo, Roscrea, Co. Tipperary.
	438	1255	66	146	1	213	
75	442	1256	220	25	—	245	Mrs. M. Carville, Carrickaslane House, Castleblayney, Co. Monaghan.
76	447	1257	177	54	3	234	Mrs. M. Colleran, Cranaghmore, Athlone, Co. Roscommon.
77	453	1258	131	82	3	216	Miss M. Cremin, Granavorig, Newmarket, Co. Cork.
	455	1259	195	54	10	259	
79	465	1260	218	4	—	222	Mrs. M. Drohan, Ballynevin, Carrick-on-Suir, Co. Waterford.
	467	1261	230	25	—	255	

Pen Number	Pullet Number	Number of Sealed Copper Ring	EGGS LAID				OWNER
			Special Grade	First Grade	Second Grade	Total	
80	470	1262	104	121	8	233	Mrs. R. B. Eadie, The Poplars, Beaufort, Co. Kerry.
	471	1263	198	22	1	221	
	472	1264	132	74	—	206	
	473	1265	40	185	28	253	
81	476	1266	33	201	4	238	Mrs. R. Elkin, Leitrim House, Lecaney, Moville, Co. Donegal.
	478	1267	150	72	5	227	
82	481	1268	182	34	2	218	Miss A. Hanly, Cappa House, Cahir, Co. Tipperary.
	482	1269	179	30	7	216	
	484	1270	205	7	2	214	
83	490	1271	162	58	—	220	Mrs. M. Lynch, Knockroe Passage East, Co. Waterford.
	492	1272	98	154	5	257	
84	493	1273	155	61	1	217	Miss M. Mulcahy, Abbeyview, Clonmel, Co. Tipperary.
	496	1274	166	65	3	234	
	497	1275	207	18	—	225	
85	715	1276	252	12	4	268	Miss C. M. Brogan, Phillistown House, Trim, Co. Meath.
	718	1277	30	179	17	226	
86	512	1278	29	195	30	254	Miss K. Newman, Drinadaly, Trim, Co. Meath.
87	517	1279	226	11	—	237	Miss M. O'Brien, Moycarkey, Thurles, Co. Tipperary.
	518	1280	131	101	1	233	
88	526	1281	183	56	2	241	Mrs. K. O'Driscoll, Lisloose, Tralee, Co. Kerry.
89	529	1282	108	109	4	221	Mrs. C. Roche, Carrowcully, Ballinameen, Boyle, Co. Roscommon.
	531	1283	142	75	2	219	
	533	1284	199	7	—	206	

RHODE ISLAND RED (64 Pullets).

Pen Number	Pullet Number	Number of Sealed Copper Ring	EGGS LAID				OWNER
			Special Grade	First Grade	Second Grade	Total	
26	154	1206	22	200	6	228	Mr. R. D. Baker, Whitehall Towers, Rathfarnham, Co. Dublin.
27	158 160	1207 1208	30 180	195 45	15 —	240 225	Mr. W. Bland, Sallyford P. F., Rath, Portarlinton, Laoighis.
29	173 174	1210 1211	13 12	200 190	16 21	229 223	Mrs. M. Campion, Narraghmore Rectory, Ballytore, Co. Kildare.
31	181 186	1212 1213	87 72	143 141	1 3	231 216	Mrs. D. C. Chearnley, Salterbridge P. F., The Deeps, Wexford.
32	190	1214	13	206	21	240	Miss S. Cooke, Aske P. F., Gorey, Co. Wexford.
33	198	1215	228	7	—	235	Miss S. D. Deane, Longraigue, Foulks Mills, Co. Wexford.
36	214	1216	50	169	13	232	Mrs. K. Earl, Grantstown House, Waterford.
38	224 225 227	1218 1219 1220	216 165 18	52 45 190	— 1 9	268 211 217	Mrs. F. Gleeson. Tinaranna, Killaloe, Co. Clare.
40	236 237	1224 1225	29 179	212 51	25 3	266 233	Mrs. E. Hornidge, Tulfarris P. F., Blessington, Co. Wicklow.
41	243 244	1226 1227	94 70	131 163	4 6	229 239	Mrs. M. G. King, Beech Grove, Donadea, Co. Kildare.

Pen Number	Pullet Number	Number of Sealed Copper Ring	EGGS LAID				OWNER
			Special Grade	First Grade	Second Grade	Total	
42	247	1228	32	179	11	222	Mrs. L. V. Lane-Allman, Woodlands, Bandon, Co. Cork.
43	254	1229	73	151	2	226	Miss S. McElligott, Bedford, Listowel, Co. Kerry.
	255	1230	80	120	3	203	
44	741	1231	98	148	13	229	Mrs. K. Earl, Grantstown House, Waterford.
	744	1232	14	190	53	257	
45	265	1233	27	178	5	210	Mrs. M. A. Miller, Millview, Lenamore, Rathowen, Co. Longford.
47	277	1234	89	126	4	219	Mrs. E. M. O'Flynn, Prohurst, Milford, Charleville, Co. Cork.
	280	1235	188	71	—	209	
51	301	1240	162	71	—	233	Miss B. Rafter, Knockthomas, Nurney, Bagenalstown, Co. Carlow.
	308	1241	221	9	—	230	
	306	1242	224	31	—	255	
52	307	1243	30	194	4	228	Capt. H. M. S. Redmond, Popefield, Athy, Laoighis.
	308	1244	124	128	2	254	
53	314	1245	145	55	2	202	Miss D. Strong, Moate House, Kells (Ceanannus Mor), Co. Meath.
	315	1246	149	84	2	235	
93	551	1288	182	47	6	235	Mrs. H. Bruce, Hill Brook, Birr, Offaly.
95	562	1290	87	136	8	231	Mrs. C. Clarke, Mullanstown, Ardee, Co. Louth.
96	565	1291	156	54	1	211	Mrs. M. Costello, Duagh, Kilmorna, Co. Kerry.
	566	1292	202	17	—	219	
	569	1293	49	206	4	259	

Pen Number	Pullet Number	Number of Sealed Copper Ring	EGGS LAID				OWNER
			Special Grade	First Grade	Second Grade	Total	
97	512	1294	44	194	6	244	Mrs. M. Cummins, Tullagher Poultry Stn., New Ross, Co. Wexford.
98	577	1295	64	160	14	238	Mrs. M. Cruite, Tulla, Three Castles, Co. Kilkenny.
	578	1296	194	36	—	230	
	582	1297	182	39	1	222	
101	599	1298	103	113	1	217	Mrs. E. Hodgins, Dangan, Roscrea, Co. Tipperary.
	600	1299	112	113	5	230	
103	607	1300	199	2	—	201	Mrs. H. Langrell, Killinure, Tullow, Co. Wicklow.
104	614	1302	199	21	4	224	Mrs. E. Loughrey, Drummana, Crusheen, Ennis, Co. Clare.
	615	1303	124	116	2	242	
	616	1304	184	54	2	240	
	617	1305	192	8	—	200	
106	626	1308	217	6	—	223	Mrs. J. McCarthy, Caherelly Castle, Grange, Kilmallock, Co. Limerick.
	628	1309	227	—	—	227	
107	633	1310	74	172	12	258	Mrs. O. McKenna, Doagheys, Glasslough, Co. Monaghan.
108	638	1311	174	36	2	212	Miss C. Mealiff, Ballinamona House, Tullamore, Offaly.
109	643	1313	80	127	18	225	Mr. P. Meegan, Drummonreagh, Broomfield, Castleblayney, Co. Monaghan.
	644	1312	144	78	2	224	
	645	1314	105	98	6	209	
110	652	1315	17	189	25	231	Mrs. M. Molyneux, The Decoy, Dunlavin, Co. Wicklow.
112	665	1316	172	37	1	210	Mr. W. Murphy, Skeeter Park, Cleariestown, Co. Wexford.

Pen Number	Pullet Number	Number of Sealed Copper Ring	EGGS LAID				OWNER
			Special Grade	First Grade	Second Grade	Total	
113	667	1317	168	46	2	216	Miss M. O'Donovan, Dromore, Villierstown, Cappoquin, Co. Waterford.
	668	1318	207	1	—	208	
	671	1319	75	149	9	233	
114	675	1320	131	98	1	230	Mrs. E. M. O'Flynn, Prohurst, Milford, Charleville, Co. Cork.
	677	1321	27	175	15	217	
115	679	1322	131	94	4	229	Mrs. P. O'Reilly, St. Johnsfort, Ardee, Co. Meath.
	680	1323	135	105	1	241	

WHITE LEGHORN (33 Pullets).

Pen Number	Pullet Number	Number of Sealed Copper Ring	EGGS LAID				OWNER
			Special Grade	First Grade	Second Grade	Total	
57	331	1023	125	75	5	205	Mrs. L. Ahern, "The Garrison," Ballymagooley, Mallow, Co. Cork.
58	339	1024	181	35	10	226	Mr. L. Burke, Santry Hall, Santry, Co. Dublin.
60	349	1026	195	39	2	236	Miss K. Cunningham, Monreade P. F., Naas, Co. Kildare.
	351	1027	151	104	6	261	
	352	1028	201	32	1	234	
	353	1029	23	213	11	247	
61	355	1030	190	47	—	237	Miss A. Fitzgerald, Ardgoul, Rathkeale, Co. Limerick.
	358	1031	192	32	—	224	
	359	1032	188	64	3	255	
	360	1033	76	149	3	228	
62	367	1035	20	201	29	250	Mrs. M. E. Higgins, Carramarla Lodge, Claremorris, Co. Mayo.
	368	1036	158	83	2	243	

Pen Number	Pullet Number	Number of Sealed Copper Ring	EGGS LAID				OWNER
			Special Grade	First Grade	Second Grade	Total	
63	373	1037	154	68	2	224	Mrs. E. Hornidge, Tulfarris P. F., Blessington, Co. Wicklow.
	376	1038	44	168	20	232	
	378	1039	245	11	—	256	
64	379	1040	112	108	—	220	Mrs. J. McCarthy, Caherelly Castle, Grange, Kilmallock, Co. Limerick.
	381	1041	149	58	1	208	
65	385	1042	220	31	—	251	Miss S. M. Olden, Rockgrove P. F., Ring, Clonakilty, Co. Cork.
	386	1043	125	125	3	253	
	388	1044	168	53	1	222	
66	393	1371	215	5	—	220	Miss E. M. O'Keeffe, St. Rita's P. Stn., Lake Vale, Ballydesmond, Co. Cork.
	394	1372	192	23	4	219	
	395	1373	254	1	—	255	
	396	1374	115	112	2	229	
67	724	1375	136	76	4	216	Mrs. M. G. King, Beech Grove, Donadea, Co. Kildare.
	726	1376	128	76	5	209	
68	727	1377	75	143	5	223	Rev. Bro. Bergin, Our Lady of Lourdes, Cahermoyle, Ardagh, Co. Limerick.
	728	1378	143	88	—	231	
	729	1379	98	130	5	233	
	730	1380	197	41	—	238	
69	413	1381	229	2	—	231	Mrs. M. E. Shanley, Dromard, Dromod, Co. Roscommon.
70	415	1382	206	22	—	228	Mrs. J. Simpson, Clonoulty, Goold's Cross, Co. Tipperary.
	416	1383	175	43	1	224	

LIGHT SUSSEX (12 Pullets).

Pen Number	Pullet Number	Number of Sealed Copper Ring	EGGS LAID				OWNER
			Special Grade	First Grade	Second Grade	Total	
28	163	1209	52	179	9	240	Mr. F. S. Brown, Eastwood, Bagenalstown, Co. Carlow.
37	220	1217	96	125	7	228	Mr. W. Fraser, Twigs Park, Manorhamilton, Co. Leitrim.
49	291	1236	26	205	20	251	Mrs. E. M. Perceval, Temple House, Ballymote, Co. Sligo.
50	295	1237	114	109	4	227	Miss D. M. Place, Rosemount, New Ross, Co. Wexford.
	296	1238	186	26	1	213	
	299	1239	110	112	19	241	
54	321	1247	146	65	1	212	Miss P. White, Gortnafluir P. F., Clonmel, Co. Tipperary.
	323	1248	176	52	—	228	
56	147	1249	164	38	1	203	Miss P. Alley, Hill P. F., Athboy, Co. Meath.
	148	1250	161	42	—	203	
	149	1251	20	222	30	272	
94	708	1289	149	100	4	253	Miss E. Walsh, Ballylemon Lodge, Cappagh, Co. Waterford.

BARRED ROCK (6 Pullets).

Pen Number	Pullet Number	Number of Sealed Copper Ring	EGGS LAID				OWNER
			Special Grade	First Grade	Second Grade	Total	
39	230	1221	50	195	4	249	Mr. J. H. Henderson, Ardrum, Innisearra, Co. Cork.
	231	1222	101	109	4	214	
	223	1223	101	111	—	212	
90	591	1285	46	178	6	230	Mrs. E. A. Henderson, Ardrum, Innisearra, Co. Cork.
	593	1286	29	177	5	211	
92	545	1287	40	173	8	221	Mrs. N. Browne, Burrane Lower, Knock, Ennis, Co. Clare.

BUFF ROCK (5 Pullets).

Pen Number	Pullet Number	Number of Sealed Copper Ring	EGGS LAID				OWNER
			Special Grade	First Grade	Second Grade	Total	
105	619	1306	134	73	3	210	Mrs. K. McCabe, Derry, Aughnamullen, Castleblayney, Co. Monaghan.
	623	1307	103	106	2	213	
117	692	1324	25	179	13	217	Mrs. N. Ryan, Cluggin House, Oola, Co. Limerick.
	694	1325	190	29	—	219	
118	702	1326	23	179	14	216	Sister-in-Charge, Technical School, Stradbally, Laoighis.

BLACK MINORCA (1 Pullet).

Pen Number	Pullet Number	Number of Sealed Copper Ring	EGGS LAID				OWNER
			Special Grade	First Grade	Second Grade	Total	
59	346	1025	74	133	2	209	Mrs. R. Cochrane, Tullyroe, Tremane, Co. Roscommon.

CERTIFICATES OF MERIT.

Certificates were awarded as follows:—

- (a) A Special Certificate for individual birds laying 220 first grade eggs or over.
- (b) A First Class Certificate for individual birds laying 200 but less than 220 first grade eggs.
- (c) A Second Class Certificate for individual birds laying less than 200, but over 170 first grade eggs.

Individual birds producing more than twenty per cent. of second grade eggs were ineligible for Certificates.

The following Tables give particulars of the number of eggs laid by individual birds which qualified for Certificates, together with the Class of Certificate awarded in each case:—

TABLE XIV.
SECTION I.—WHITE WYANDOTTE.

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
Miss P. Alley, Hill Poultry Farm, Athboy, Co. Meath.	1	1	246	12	258	Special
		2	184	8	192	Second
		4	218	16	234	First
		5	216	12	228	First
Mrs. W. D. Baker, Whitehall Towers, Rathfarnham, Co. Dublin.	2	8	195	25	220	Second
		9	209	5	214	First
		10	180	—	180	Second
Rev. Bro. Bergin, Our Lady of Lourdes, Cahermoyle, Ardagh, Co. Limerick.	3	13	225	—	225	Special
		14	192	1	193	Second
		15	232	—	232	Special
		16	182	1	183	Second
		18	187	—	187	Second
Rev. J. R. Boyd, The Rectory, Killaloe, Co. Clare.	4	19	234	—	234	Special
		20	205	16	221	First
		21	178	26	204	Second
		23	209	—	209	First
		24	218	1	219	First
Miss P. Brady, Newtowngirley, Ceanannus Mor, Co. Meath.	5	25	215	—	215	First
		26	234	—	234	Special
		29	232	2	234	Special
Mrs. C. P. Chearnley, Glendoneen, Ballinhassig, Co. Cork.	6	34	195	16	211	Second
		35	236	8	244	Special
		36	239	5	244	Special

NAME AND ADDRESS OF OWNER	Pen No	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
Mrs. M. Connolly, Carrigamore Corvalley, Co. Monaghan.	7	37	253	4	257	Special
		38	246	—	246	Special
		39	256	2	258	Special
		40	195	—	195	Second
		41	183	—	183	Second
		42	220	—	220	Special
Mrs. L. P. Cox, Victoria Park, Donnycarney, Co. Dublin.	8	43	275	6	281	Special
		44	227	4	231	Special
		45	189	36	225	Second
		46	185	44	229	Second
Mrs. R. Croasdaile, Rynn, Rosnalis, Mountmellick, Laoighis.	9	49	191	6	197	Second
		52	185	—	185	Second
		53	201	3	204	First
		54	201	35	236	First
Mrs. M. Deegan, Roadside Poultry Farm, Lodge Park, Freshford, Co. Kilkenny.	10	55	209	—	209	First
Mr. W. Frazer, Twigs Park, Manorhamilton, Co. Leitrim.	11	61	225	8	233	Special
		62	211	6	217	First
		63	173	39	212	Second
		64	247	—	247	Special
		66	219	—	219	First
Mrs. E. Hornidge, Tulfarris Poultry Farm, Blessington, Co. Wicklow.	13	74	215	—	215	First
		75	260	—	260	Special
		76	232	4	236	Special
		77	213	—	213	First
		78	219	3	222	First
Mr. W. F. Lawrence, Clonminch Poultry Farm, Tullamore, Offaly.	14	80	228	5	233	Special
		81	216	11	227	First
		83	245	2	247	Special
Mrs. N. McElligott, Bedford, Listowel, Co. Kerry.	15	85	213	3	216	First
		86	190	9	199	Second
		88	184	2	186	Second
		89	214	1	215	First
		90	222	1	223	Special
Mrs. R. Murphy, Newrath, Waterford.	16	92	240	4	244	Special
		93	192	3	195	Second
		95	218	32	250	First
Mrs. E. M. O'Hara, Mormington, Crookedwood, Co. Westmeath.	18	103	172	1	173	Second
		106	204	1	205	First
		108	173	23	196	Second

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
Miss F. H. Powell, Crouenstown, Delvin, Co. Westmeath.	19	110	223	2	225	Special
		111	177	1	178	Second
		112	187	—	187	Second
		113	178	—	178	Second
		114	219	1	220	First
Miss B. Quain, Anglesboro', Mitchelstown, Co. Cork.	20	117	268	3	271	Special
		118	246	6	252	Special
		119	210	33	243	First
		120	223	38	261	Special
Mrs. M. Stanton, Woodlands, Glanmire, Co. Cork.	21	123	210	1	211	First
		124	173	40	213	Second
		126	221	38	259	Special
Mrs. R. Murphy, Newrath, Waterford.	22	733	210	30	240	First
		734	179	12	191	Second
		735	229	19	248	Special
		736	208	18	226	First
Miss A. G. Twigg, Greenwood, Malahide, Co. Dublin.	23	133	224	—	224	Special
		134	194	—	194	Second
		135	255	—	255	Special
		136	211	—	211	First
		137	260	1	261	Special
Miss P. White, Gortnafluir Poultry Farm, Clonmel, Co. Tipperary.	24	139	178	—	178	Second
		140	178	42	220	Second
		141	192	1	193	Second
		142	202	5	207	First
		143	190	7	197	Second
Mrs. L. P. Cox, Victoria Park, Donnycarney, Co. Dublin.	25	745	184	16	200	Second
		747	234	1	235	Special
		748	222	13	235	Special
		749	269	1	270	Special
		750	181	5	186	Second

SECTION II.—SITTING BREEDS (other than White Wyandotte).

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
<i>Rhode Island Red.</i> Mr. W. D. Baker, Whitehall Towers, Rathfarnham, Co. Dublin.	26	152 154 155	199 222 186	5 6 5	195 228 191	Second Special Second
<i>Rhode Island Red.</i> Mr. W. Bland, Sallyford Poultry Farm, Rath, Portarlington, Laoighis.	27	158 159 160 161	225 198 225 178	15 8 — 11	240 206 225 189	Special Second Special Second
<i>Light Sussex.</i> Mr. F. S. Browne, Eastwood, Bagenalstown, Co. Carlow.	28	163 164 168	231 172 197	9 16 4	240 188 201	Special Second Second
<i>Rhode Island Red.</i> Mrs. M. Campion, Narraghmore Rectory, Ballytore, Co. Kildare.	29	170 173 174	193 213 202	13 16 21	208 229 223	Second First First
<i>Rhode Island Red.</i> Mrs. C. L. Cardew, Castlefогerty, Thurles, Co. Tipperary.	30	176	179	37	216	Second
<i>Rhode Island Red.</i> Mrs. D. C. Chearnley, Salterbridge Poultry Farm, The Deeps, Wexford.	31	181 186	230 213	1 3	231 216	Special First
<i>Rhode Island Red.</i> Miss A. Cooke, Aske Poultry Farm, Gorey, Co. Wexford.	32	187 190 191	183 219 183	11 21 8	194 240 191	Second First Second
<i>Rhode Island Red.</i> Miss S. D. Deane, Longraigue, Foulks Mills, Co. Wexford.	33	193 194 195 197 198	194 181 192 180 235	— — 11 1 —	194 181 203 181 235	Second Second Second Second Special
<i>Rhode Island Red.</i> Mrs. E. M. Dennehy, Ballymanus, Stradbally, Laoighis.	34	200	194	25	219	Second

NAME AND ADDRESS OF OWNER	Pen No	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
<i>Rhode Island Red.</i> Rev. Bro. Dominick, Agricultural College, Mount Bellew, Co. Galway.	35	205	181	37	218	Second
<i>Rhode Island Red.</i> Mrs. K. Earl, Grantstown House, Waterford.	36	212 214	192 219	5 13	197 232	Second First
<i>Light Sussex.</i> Mr. W. Frazer, Twigs Park, Manorhamilton, Co. Leitrim.	37	217 220	171 221	5 7	176 228	Second Special
<i>Rhode Island Red.</i> Mrs. F. Gleeson, Tinarana, Killaloe, Co. Clare.	38	224 225 227	268 210 208	— 1 9	268 211 217	Special First First
<i>Barred Rock.</i> Mr. J. S. Henderson, Ardrum, Inniscarra, Co. Cork.	39	230 231 232 233 234	245 210 174 203 191	4 4 — — 2	249 214 174 203 193	Special First Second First Second
<i>Rhode Island Red.</i> Mrs. E. Hornidge, Tulfarris Poultry Farm, Blessington, Co. Wicklow.	40	236 237 238 239 240	241 230 180 199 198	25 3 4 2 6	266 233 184 201 204	Special Special Second Second Second
<i>Rhode Island Red.</i> Mrs. M. G. King, Beech Grove, Donadea, Co. Kildare.	41	241 243 244	187 225 233	1 4 6	188 229 239	Second Special Special
<i>Rhode Island Red.</i> Mrs. L. V. Lane-Allman, Woodlands, Bandon, Co. Cork.	42	247 251	211 196	11 43	222 239	First Second
<i>Rhode Island Red.</i> Miss S. McElligott, Bedford, Listowel, Co. Kerry.	43	254 255 256	224 201 180	2 3 5	226 204 185	Special First Second

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
<i>Rhode Island Red.</i> Mrs. K. Earl, Grantstown House, Waterford.	44	739 741	195 216	47 13	242 229	Second First
<i>Rhode Island Red.</i> Mrs. M. A. Miller, Millview, Lenamore, Co. Longford.	45	265	205	5	210	First
<i>Rhode Island Red.</i> Miss M. O'Donovan, Dromore, Villierstown, Cappoquin, Co. Waterford.	46	274 275 276	183 194 199	2 29 1	185 223 200	Second Second Second
<i>Rhode Island Red.</i> Mrs. E. M. O'Flynn, Prohurst, Milford, Charleville, Co. Cork.	47	277 279 280	215 171 209	4 7 —	219 178 209	First Second First
<i>Light Sussex.</i> Rev. J. R. O'Rourke, Black Lion Poultry Farm, Blue Ball, Tullamore, Offaly.	48	283 286	186 190	1 1	187 191	Second Second
<i>Light Sussex.</i> Mrs. E. M. Perceval, Temple House, Ballymote, Co. Sligo.	49	290 291 294	175 231 196	2 20 6	177 251 202	Second Special Second
<i>Light Sussex.</i> Miss D. M. Pluce, Rosemount, New Ross, Co. Wexford.	50	295 296 299	223 212 222	4 1 19	227 213 241	Special First Special
<i>Rhode Island Red.</i> Miss B. Rafter, Knockthomas, Nurney, Bagenalstown, Co. Carlow.	51	301 302 303 304 306	233 194 230 171 255	— — — 1 —	233 194 230 172 255	Special Second Special Second Special
<i>Rhode Island Red.</i> Capt. H. M. S. Redmond, Popefield, Athy, Laoighis.	52	307 308 311	224 252 182	4 2 23	228 254 205	Special Special Second

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
<i>Rhode Island Red.</i> Miss D. Strong, Moate House, Kells (Ceanannus Mor), Co. Meath.	53	314 315	200 233	2 2	202 235	First Special
<i>Light Sussex.</i> Miss P. White, Gortnafluir Poultry Farm, Clonmel, Co. Tipperary.	54	319 321 323 324	197 212 228 189	— 1 — 8	197 213 228 197	Second First Special Second
<i>Light Sussex.</i> Miss P. Alley, Hill Poultry Farm, Athboy, Co. Meath.	56	147 148 149	202 203 242	1 — 30	203 203 272	First First Special

SECTION III.—Any NON-SITTING BREEDS.

NAME AND ADDRESS OF OWNER	Pen No	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
<i>White Leghorn.</i> Mrs. L. Ahern, "The Garrison," Ballymagooly. Co. Cork.	57	331 334 335 336	200 195 176 197	5 21 2 —	205 216 178 197	First Second Second Second
<i>White Leghorn.</i> Mrs. L. Burke, Santry Hall, Santry, Co. Dublin.	58	338 339 342	198 217 180	3 10 —	201 227 180	Second First Second
<i>Black Minorca.</i> Mrs. R. Cochrane, Tullyroe, Tremane, Co. Roscommon.	59	346	206	2	208	First
<i>White Leghorn.</i> Miss K. Cunningham, Monreade Poultry Farm, Naas, Co. Kildare.	60	349 350 351 352 353 354	234 199 255 233 236 190	2 9 6 1 11 11	236 208 261 234 247 201	Special Second Special Special Special Second

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
<i>White Leghorn.</i> Miss A. Fitzgerald, Ardgoul, Rathkeale, Co. Limerick.	61	355 356 358 359 360	237 179 224 252 225	— 20 — 3 3	237 208 224 255 228	Special Second Special Special Special
<i>White Leghorn.</i> Mrs. M. E. Higgins, Carramarla Lodge, Claremorris, Co. Mayo.	62	367 368	221 241	29 2	250 243	Special Special
<i>White Leghorn.</i> Mrs. E. Hornidge, Tulfarris Poultry Farm, Blessington, Co. Wicklow.	63	373 376 377 378	222 212 174 256	2 20 3 —	224 232 177 256	Special First Second Special
<i>White Leghorn.</i> Mrs. J. McCarthy, Caherelly Castle, Grange, Kilmallock, Co. Limerick.	64	379 380 381 383	220 195 207 209	— 9 1 11	220 204 208 220	Special Second First First
<i>White Leghorn.</i> Miss S. M. Olden, Rockgrove Poultry Farm, Ring, Clonakilty, Co. Cork.	65	385 386 387 388 389 390	251 250 179 221 198 189	— 3 1 1 1 42	251 253 180 222 199 231	Special Special Second Special Second Second
<i>White Leghorn.</i> Miss E. M. O'Keeffe, St. Rita's Poultry Station, Lake Vale, Ballydesmond, Co. Cork.	66	393 394 395 396	220 215 235 227	— 4 — 2	220 219 255 229	Special First Special Special
<i>White Leghorn.</i> Mrs. M. G. King, Beech Grove, Donadea, Co. Kildare.	67	721 723 724 725 726	180 187 212 199 204	13 4 4 28 5	193 191 216 227 209	Second Second First Second First
<i>White Leghorn.</i> Rev. Bro. Bergin, Our Lady of Lourdes, Cahermoyle, Ardagh, Co. Limerick.	68	727 728 729 730 731 732	218 231 228 238 195 197	5 — 5 — 15 1	223 231 233 238 210 198	First Special Special Special Second Second

NAME AND ADDRESS OF OWNER	Pen No	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
<i>White Leghorn.</i> Mrs. M. E. Shanley, Dromard, Dromod, Co. Roscommon.	69	412 413 414	185 231 186	— — 25	185 231 211	Second Special Second
<i>White Leghorn.</i> Mrs. J. Simpson, Clonulty, Goold's Cross, Co. Tipperary.	70	415 416 417	228 222 188	— 1 4	228 224 192	Special Special Second
<i>White Leghorn.</i> Mrs. M. A. Walsh, Wardstown, Athboy, Co. Meath.	71	421 423 425 426	199 172 193 197	31 13 3 45	230 185 196 242	Second Second Second Second

SECTION IV.—WHITE WYANDOTTE. STATION HOLDERS.

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
Mr. A. Mackey, Tallaght, Co. Dublin.	72	718	179	23	202	Second
Miss M. M. Bowe, Graigueavalla, Errill, Ballybrophy, Laoighis.	73	429	201	4	205	First
Miss M. Byrne, Montevideo, Roscrea, Co. Tipperary.	74	433 435 438	177 205 212	8 6 1	185 211 213	Second First First
Mrs. M. P. Carville, Carrickaslane House, Castleblayney, Co. Monaghan.	75	439 442	173 245	2 —	175 245	Second Special
Mrs. M. Colleran, Cranaghmore, Athlone, Co. Roscommon.	76	447 448	231 198	3 10	234 208	Special Second
Miss M. Cremin, Granavorig, Newmarket, Co. Cork.	77	452 453 455 456	175 213 249 185	4 3 10 32	179 216 259 217	Second First Special Second

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
Miss K. Cullen, Cloone House, Tempiemore, Co. Tipperary.	78	458	193	—	193	Second
Mrs. M. Drohan, Ballynevin, Carrick-on-Suir, Co. Waterford.	79	465 467	222 255	— —	222 255	Special Special
Mrs. R. B. Eadie, The Poplars, Beaufort, Co. Kerry.	80	469 470 471 472 473	171 225 220 206 225	18 8 1 — 28	189 233 221 206 253	Second Special Special First Special
Mrs. R. Elkin, Leitrim House, Lecanoy, Moville, Co. Donegal.	81	476 478	234 222	4 5	238 227	Special Special
Miss A. Hanly, Cappa House, Cahir, Co. Tipperary.	82	481 482 483 484 486	216 209 173 212 175	2 7 4 2 8	218 216 177 214 183	First First Second First Second
Mrs. M. Lynch, Knockroe, Passage East, Co. Waterford.	83	487 490 491 492	172 220 194 252	— — 5 5	172 220 199 257	Second Special Second Special
Miss M. Mulcahy, Abbeyview, Clonmel, Co. Tipperary.	84	493 496 497 498	216 231 225 178	1 3 — 5	217 234 225 183	First Special Special Second
Miss C. M. Brogan, Phillistown House, Trim, Co. Meath.	85	715 718	264 209	4 17	268 226	Special First
Miss K. Newman, Drinadaly, Trim, Co. Meath.	86	512 513 515	224 195 185	30 24 17	254 219 202	Special Second Second
Miss M. O'Brien, Moycarkey, Thurles, Co. Tipperary.	87	517 518	237 232	— 1	237 233	Special Special

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
Mrs. K. O'Driscoll, Lisloose, Tralee, Co. Kerry.	88	525	189	—	189	Second
		526	239	2	241	Special
		528	190	3	193	Second
Mrs. C. Roche, Carrowcully, Ballinacreen, Boyle, Co. Roscommon.	89	529	217	4	221	First
		531	217	2	219	First
		533	206	—	206	First

SECTION V.—SITTING BREEDS (other than White Wyandotte).
STATION HOLDERS.

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
<i>Barred Rock.</i> Mrs. E. A. Henderson, Ardrum, Inniscarra, Co. Cork.	90	591	224	6	230	Special
		593	206	5	211	First
<i>Barred Rock.</i> Sister M. Alphonsus, R. D. E. School, Swinford, Co. Mayo.	91	538	178	4	182	Second
		540	187	3	190	Second
<i>Barred Rock.</i> Mrs. N. Browne, Burrane Lower, Knock, Ennis, Co. Clare.	92	543	180	1	181	Second
		545	213	8	221	First
<i>Rhode Island Red.</i> Mrs. H. Bruce, Hill Brook, Birr, Offaly.	93	547	179	—	179	Second
		551	229	6	235	Special
<i>Light Sussex.</i> Miss E. Walsh, Ballylemon Lodge, Cappagh, Co. Waterford.	94	708	249	4	253	Special
<i>Rhode Island Red.</i> Mrs. C. Clarke, Mullanstown House, Ardee, Co. Louth.	95	562	223	8	231	Special
		564	196	—	196	Second
<i>Rhode Island Red.</i> Mrs. M. Costello, Duagh, Kilmorna, Co. Kerry.	96	565	210	1	211	First
		566	219	—	219	First
		567	172	—	172	Second
		569	255	4	259	Special
		570	180	—	180	Second

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
<i>Rhode Island Red.</i> Mrs. M. Cummins, Tullagher Poultry Station, New Ross, Co. Wexford.	97	572 574	238 186	6 22	244 208	Special Second
<i>Rhode Island Red.</i> Mrs. M. Cruite, Tulla, Three Castles, Co. Kilkenny.	98	577 578 582	224 230 221	14 — 1	238 230 222	Special Special Special
<i>Buff Rock.</i> Mrs. M. T. Ffrench, "Poultfaile," New Ross, Co. Wexford.	100	588	181	10	191	Second
<i>Rhode Island Red.</i> Mrs. E. M. Hodgins, Dangan, Roscrea, Co. Tipperary.	101	599 597 599 600	181 183 216 225	1 18 1 5	182 201 217 230	Second Second First Special
<i>Barred Rock.</i> Mrs. M. A. Kelly, Carronstown, Ballivor, Co. Meath.	102	601 604 606	179 175 187	3 7 3	182 182 190	Second Second Second
<i>Rhode Island Red.</i> Mrs. H. Langrell, Killinure, Tullow, Co. Wicklow.	103	607 611 612	201 184 173	— — 3	201 184 176	First Second Second
<i>Rhode Island Red.</i> Mrs. E. Loughrey, Drumnumna, Crusheen, Co. Clare.	104	613 614 615 616 617 618	176 220 240 233 200 197	1 4 2 2 — 9	177 224 242 240 200 206	Second Special Special Special First Second
<i>Buff Rock.</i> Mrs. K. McCabe, Derry, Aughnamullen, Castleblavney, Co. Monaghan.	105	619 623	207 211	3 2	210 213	First First
<i>Rhode Island Red.</i> Mrs. J. McCarthy, Caherelly Castle, Grange, Kilmallock, Co. Limerick.	106	626 628	223 227	— —	223 227	Special Special

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
<i>Rhode Island Red.</i> Mrs. O. McKenna, Dangheys, Glasslough, Co. Monaghan.	107	632 633 634	186 246 175	11 12 5	197 258 180	Second Special Second
<i>Rhode Island Red.</i> Miss C. Meadiff, Ballinamona House, Tullamore, Offaly.	108	638 639 640 642	210 184 176 190	2 8 5 13	212 192 181 203	First Second Second Second
<i>Rhode Island Red.</i> Mr. P. Meegan, Drummonveagh, Broomfield, Castleblayney, Co. Monaghan.	109	643 644 645 648	207 222 203 199	18 2 6 3	225 224 209 202	First Special First Second
<i>Rhode Island Red.</i> Mrs. M. Molyneux, The Decoy, Dunlavin, Co. Wicklow.	110	649 651 652	177 191 206	11 2 25	188 193 231	Second Second First
<i>Rhode Island Red.</i> Mrs. M. B. Morrissey, Ballycoe House, Dungarvan, Co. Waterford.	111	657 658	174 197	1 —	175 197	Second Second
<i>Rhode Island Red.</i> Mr. W. Murphy, Skeeter Park, Cleariestown, Co. Wexford.	112	662 664 665 666	191 197 209 197	— 1 1 4	191 198 210 201	Second Second First Second
<i>Rhode Island Red.</i> Miss M. O'Donovan, Dromore, Villierstown, Cappoquin, Co. Waterford.	113	667 668 670 671	214 208 183 224	2 — — 9	216 208 183 233	First First Second Special
<i>Rhode Island Red.</i> Mrs. E. M. O'Flynn, Prohurst, Milford, Charleville, Co. Cork.	114	673 675 676 677 678	197 229 198 202 184	1 1 1 15 4	198 230 199 217 188	Second Special Second First Second
<i>Rhode Island Red.</i> Mrs. P. O'Reilly, St. Johnsfort, Ardee, Co. Meath.	115	679 680	225 240	4 1	229 241	Special Special

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
<i>Barred Rock.</i> Miss B. Power, Sliemane, Butlerstown, Co. Waterford.	116	688	186	16	202	Second
<i>Buff Rock.</i> Mrs. N. Ryan, Cluggin House, Oola, Co. Limerick.	117	692 693 694	204 176 219	13 — —	217 176 219	First Second First
<i>Buff Rock.</i> Sister-in-Charge, Technical School, Stradbally, Laoighis.	118	699 702	184 202	16 14	200 216	Second First

TABLE XV.

Number and percentage of Pullets of each Breed which qualified for
Certificates of Merit.

Breed	Number of Pullets for full Period	Number of Certificates Awarded	Percentage of Pullets awarded Certificates	Percentage Distribution		
				Special	First Class	Second Class
White Wyandotte ..	230	142	% 61.7	% 23.0	% 17.4	% 21.3
Rhode Island Red ..	218	120	55.0	16.5	12.4	26.1
White Leghorn ..	74	59	79.7	33.8	12.1	33.8
Light Sussex ..	43	21	48.8	18.6	9.3	20.9
Barred Rock ..	31	15	48.4	6.5	12.9	29.0
Buff Rock ..	19	8	42.1	—	26.3	15.8
Black Minorca ..	5	1	20.0	—	20.0	—
White Sussex ..	5	—	—	—	—	—
All Breeds ..	625	366	58.5	19.8	14.4	24.3

TABLE XVI.

The following Table gives the number of pullets that died during the Test, and the Cause of death in each case :—

Date of Death	Number of Pullet	Number of Pen	Breed	Cause of Death
1934				
Oct. 16	357	61	White Leghorn ..	Hæmorrhage from the ovary.
" 20	320	54	Light Sussex ..	Rupture of the cloaca and protrusion of the bowels through the rupture.
Nov. 21	588	100	Duff Rock ..	Peritonitis and leukaemia.
" 22	60	10	White Wyandotte	Enteritis.
Dec. 3	162	27	Rhode Island Red	Large ovarian tumour (sarcoma).
" 12	696	117	Duff Rock ..	Peritonitis.
" 24	374	63	White Leghorn ..	Gout.
1935				
Jan. 9	438	79	White Wyandotte	Gout.
" 9	522	88	White Wyandotte	Fatty liver.
" 10	576	97	Rhode Island Red	Gout.
" 19	305	51	Rhode Island Red	Gout.
" 21	630	106	Rhode Island Red	Extensive tuberculosis.
" 21	56	10	White Wyandotte	Coccidiosis and intestinal round worms
" 31	325	55	White Sussex ..	Inflammation of the oviduct.
Feb. 5	527	88	White Wyandotte	Peritonitis and inflammation of the oviduct.
" 13	495	84	White Wyandotte	Tuberculosis and hæmorrhage from a ruptured liver.
" 13	595	101	Rhode Island Red	Peritonitis and inflammation of the oviduct.
" 15	559	95	Rhode Island Red	Advanced tuberculosis.
" 21	204	34	Rhode Island Red	Enteritis and a fatty liver.
" 25	203	34	Rhode Island Red	Peritonitis and inflammation of the oviduct; also affected with tuberculosis.
" 25	636	107	Rhode Island Red	Tuberculosis.
Mar. 2	625	106	Rhode Island Red	Tuberculosis.
" 2	714	72	White Wyandotte	Tuberculosis.
" 12	411	60	White Leghorn ..	Hæmorrhage from a small blood tumour on wing.
" 13	288	48	Light Sussex ..	Gout.
" 22	58	10	White Wyandotte	Leukaemia.
" 23	33	6	White Wyandotte	Gout.
" 25	102	17	White Wyandotte	Leukaemia.
" 25	202	34	Rhode Island Red	Peritonitis and inflammation of the oviduct.
" 26	561	95	Rhode Island Red	Tuberculosis.
April 3	441	75	White Wyandotte	Hæmorrhage from a ruptured liver which was affected with tuberculosis.
" 10	344	59	Black Minorca ..	Chronic peritonitis and inflammation of the oviduct.
" 17	219	37	Light Sussex ..	Chronic peritonitis.
" 18	669	113	Rhode Island Red	Tuberculosis.
" 23	740	44	Rhode Island Red	Peritonitis and inflammation of the oviduct.
" 23	341	58	White Leghorn ..	Peritonitis and inflammation of the oviduct.
" 24	432	73	White Wyandotte	Tuberculosis.
" 26	656	111	Rhode Island Red	Tuberculosis.
" 27	443	75	White Wyandotte	Tuberculosis.
May 8	424	71	White Leghorn ..	Internal tumours (sarcomata).
" 11	393	66	White Leghorn ..	Leukaemia and intestinal tapeworms
" 14	73	13	White Wyandotte	Peritonitis and inflammation of the oviduct.
" 17	57	10	White Wyandotte	Peritonitis.

Date of Death	Number of Pullet	Number of Pen	Breed	Cause of Death
May 18	445	70	White Wyandotte	Peritonitis and inflammation of the oviduct and gout.
" 22	530	61	Barred Rock ..	Tuberculosis and haemorrhage from the ovary.
" 31	582	64	White Leghorn ..	Tuberculosis.
" 31	87	15	White Wyandotte	Gout.
June 5	585	100	Buff Rock ..	Chronic inflammation of the oviduct.
" 6	199	34	Rhode Island Red	Tumours in the kidneys (sarcomata).
" 11	621	105	Buff Rock ..	Leukaemia.
" 12	371	62	White Leghorn ..	Peritonitis and inflammation of the oviduct.
" 14	450	76	White Wyandotte	Peritonitis and inflammation of the oviduct.
" 24	584	64	White Leghorn ..	Tuberculosis.
" 25	96	16	White Wyandotte	Gout and inflammation of the oviduct.
" 26	485	82	White Wyandotte	Peritonitis and inflammation of the oviduct.
" 27	428	73	White Wyandotte	Peritonitis and inflammation of the oviduct.
" 29	434	74	White Wyandotte	Peritonitis following inflammation of the oviduct.
July 3	201	34	Rhode Island Red	Coccidiosis and tapeworms, also affected with gout.
" 5	627	106	Rhode Island Red	Tuberculosis.
" 8	494	84	White Wyandotte	Tuberculosis.
" 8	541	92	Barred Rock ..	Tuberculosis.
" 12	271	46	Rhode Island Red	Enteritis.
" 16	542	92	Barred Rock ..	Haemorrhage from a fatty liver and tuberculosis.
" 19	532	89	White Wyandotte	Roup, affecting the larynx and producing asphyxia.
" 22	705	94	Light Sussex ..	Tuberculosis.
" 25	587	100	Buff Rock ..	Fatty liver and ruptured ovary.
" 27	91	16	White Wyandotte	Peritonitis following inflammation of the oviduct.
" 30	552	93	Rhode Island Red	Gout.
Aug. 12	370	62	White Leghorn ..	Tapeworm infestation.
" 12	682	115	Rhode Island Red	Peritonitis following inflammation of the oviduct.
" 14	537	91	Barred Rock ..	Peritonitis following inflammation of the oviduct.
" 20	704	94	Light Sussex ..	Oedema of the lungs.
" 28	544	92	Barred Rock ..	Haemorrhage from tuberculous liver.
" 30	59	10	White Wyandotte	Tumour in intestine.
" 30	272	46	Rhode Island Red	Tuberculosis.
Sept. 2	30	5	White Wyandotte	Leukaemia.
" 4	116	20	White Wyandotte	Inflammation of the cloaca and oedema of the lungs.

TABLE XVII.
Number and Percentage of Deaths for each Breed.

Breed	Pullets Penned	Number of Deaths	Percentage of Deaths
White Wyandotte	258	28	10.8
Rhode Island Red	240	22	9.2
White Leghorn	84	10	11.9
Light Sussex	48	5	10.4
Barred Rock	86	5	13.9
Buff Rock	24	5	20.8
Black Minorca	6	1	16.7
White Sussex	6	1	16.7
All Breeds	702	77	10.9

SECTION I.—WHITE WYANDOTTES—continued.

Order of Hatch	Number of Hens	Name and Address of Owner	Date of Hatching	Weight		EGGS LAID												EGGS PER PULLET				Average Weight of Eggs per Pullet	(a) Total Eggs from Pen.	(b) Total weight per dozen.	(c) Av. weight per dozen from Pen.	Eggs under Prescribed Weight	Number of Hens	Date of Moulting (Seven months in Italy)
				On arrival of first lb. oz.	At close of first lb. oz.	Oct. 7-Nov. 3	Nov. 4-Dec. 1	Dec. 2-Dec. 29	Dec. 30-Jan. 13	Jan. 14-Feb. 13	Feb. 14-Mar. 20	Mar. 21-Apr. 20	Apr. 21-May 18	May 19-June 15	June 16-July 13	July 14-Aug. 10	Aug. 11-Sept. 7	Special Grade	First Grade	Second Grade	Total								First Jan. 6
6	83	Mrs. A. G. Twigg, Greenwood, Malahide, Co. Dublin.	1934 Feb. " " March " " Feb.	4 12 5 3 5 8 5 8 5 12 6 1 6 2 6 7 4 15	5 0 5 8 5 8 5 8 6 2 6 2 6 2 6 7 4 15	26 23 23 24 22 20 20 20 23	16 16 22 23 23 23 23 23 23	19 19 23 23 23 23 23 23 23	19 19 23 23 23 23 23 23 23	17 17 21 21 21 21 21 21 21	17 17 16 16 16 16 16 16 16	13 13 14 14 14 14 14 14 14	10 10 10 10 10 10 10 10 10	151 180 209 209 202 222 222 222 222	73 46 46 38 34 34 34 34 34	— — — 1 1 1 1 1 1	224 194 255 211 261 261 125 125	77 85 92 92 92 92 92 92 92	23 23 23 23 23 23 23 23 23	1 1 1 1 1 1 1 1 1	July Aug. June June June July July July July							
7	4	Mrs. J. R. Boyd, The Rectory, The Killakee, Co. Clare.	1934 Feb. " " March " " " " Feb.	4 14 5 13 5 12 5 12 5 12 5 12 5 12 5 12 4 11	4 12 5 3 5 8 5 8 5 8 5 8 5 8 5 8 4 11	23 23 23 23 23 23 23 23 23	21 21 21 21 21 21 21 21 21	23 23 23 23 23 23 23 23 23	23 23 23 23 23 23 23 23 23	21 21 21 21 21 21 21 21 21	21 21 21 21 21 21 21 21 21	19 19 19 19 19 19 19 19 19	17 17 17 17 17 17 17 17 17	192 190 190 190 190 190 190 190 190	42 190 190 190 190 190 190 190 190	16 26 26 26 26 26 26 26 26	224 221 221 221 221 221 221 221 221	74 85 85 85 85 85 85 85 85	23 23 23 23 23 23 23 23 23	1 1 1 1 1 1 1 1 1	July Aug. June June June July July July July							
8	13	Mrs. E. Hornidge, Tullharris Poultry Farm, Bleasington, Co. Wicklow.	31/1/34 8/2/34 " " 31/1/34 8/2/34 " " 14/2/34	5 1 5 2 5 2 5 2 5 2 5 2 5 2 5 2 4 12	5 1 5 2 5 2 5 2 5 2 5 2 5 2 5 2 4 12	22 22 22 22 22 22 22 22 22	19 19 19 19 19 19 19 19 19	20 20 20 20 20 20 20 20 20	20 20 20 20 20 20 20 20 20	19 19 19 19 19 19 19 19 19	15 15 15 15 15 15 15 15 15	13 13 13 13 13 13 13 13 13	17 17 17 17 17 17 17 17 17	141 185 185 185 185 185 185 185 185	78 30 30 30 30 30 30 30 30	2 5 5 5 5 5 5 5 5	74 72 72 72 72 72 72 72 72	23 23 23 23 23 23 23 23 23	2 2 2 2 2 2 2 2 2	Oct. Aug. June June June July July July July								
9	22	Mrs. R. Murphy, Newrath, Waterford.	1934 March " " " " " " " "	4 12 4 12 4 10 4 10 4 10 4 10 4 10 4 10 4 15	4 14 4 10 4 10 4 10 4 10 4 10 4 10 4 10 4 15	18 18 18 18 18 18 18 18 18	20 20 20 20 20 20 20 20 20	22 22 22 22 22 22 22 22 22	22 22 22 22 22 22 22 22 22	19 19 19 19 19 19 19 19 19	20 20 20 20 20 20 20 20 20	18 18 18 18 18 18 18 18 18	21 21 21 21 21 21 21 21 21	26 107 107 107 107 107 107 107 107	184 72 72 72 72 72 72 72 72	30 13 13 13 13 13 13 13 13	340 340 340 340 340 340 340 340 340	40 38 38 38 38 38 38 38 38	23 23 23 23 23 23 23 23 23	1 1 1 1 1 1 1 1 1	July Aug. June June June July July July July							
10	3	Rev. Bro. Berghin, Our Lady of Lourdes, Cabanagh, Anagh, Co. Limerick.	1934 Feb. Mar. " " " " " " " "	5 2 5 2 5 2 5 2 5 2 5 2 5 2 5 2 5 4	5 1 5 1 5 1 5 1 5 1 5 1 5 1 5 1 5 4	22 22 22 22 22 22 22 22 22	20 20 20 20 20 20 20 20 20	20 20 20 20 20 20 20 20 20	20 20 20 20 20 20 20 20 20	19 19 1																		

D = Dead U.T. = Untrapped.

SECTION I.—WHITE WYANDOTT.—continued.

Order of Merit	Number of Pairs	NAME AND ADDRESS OF OWNER	Date of Hatching	WEIGHT		EGGS LAID														EGGS PER PULLET			Value per Pullet	Average Weight of Eggs per Pullet	(a) Total Eggs from Pen.				Bugs under Prescribed	Number of times Broody	Date of Moulting (Neck moults in italics)
				No. of Pullet	On lb. oz.	At date of test lb. oz.	Oct. 7-Nov. 3	Nov. 4-Dec. 1	Dec. 2-Dec. 29	Dec. 30-Jan. 26	Jan. 27-Feb. 23	Feb. 24-Mar. 23	Mar. 24-Apr. 18	Apr. 19-May 15	May 16-June 15	June 16-July 13	July 14-Aug. 10	Aug. 11-Sept. 7	Special Grade	Second Grade	Total	Oct. 7-Jan. 6			Total	Total weight.	Av. weight per dozen.	Total value from pen.			
11	21	Mrs. M. Stanton, Woodlands, Glennure, Co. Cork.	25/3/34	121	5 2	4 6	20 16	18 15	14 14	14 14	13 14	10 15	16 16	16 16	15 15	10 15	15 15	63	118	9	190	55	19 6½	12 2	(a) 1,276 (b) 168 1 7 (c) 22 4 (d) 6 4 0½	—	Feb., July, July				
			"	122	5 10	6 5	11 13	19 20	19 22	26 22	23 23	22 23	23 23	20 20	16 16	16 16	185	125	1	211	32	21 2½	0	(a) 1,276 (b) 168 1 7 (c) 22 4 (d) 6 4 0½	—	Oct., June Aug., June					
			"	123	5 4	4 13	19 21	22 20	20 18	22 18	23 23	23 23	23 23	14 14	15 15	15 15	185	125	1	211	43	21 2½	1	(a) 1,276 (b) 168 1 7 (c) 22 4 (d) 6 4 0½	—	July					
			"	124	4 8	5 2	24 24	24 24	20 20	22 22	23 23	23 23	23 23	18 18	17 17	15 15	25	196	40	170	36	25 12½	1	(a) 1,276 (b) 168 1 7 (c) 22 4 (d) 6 4 0½	—	Oct., July Oct., July					
			"	125	5 2	6 0	16 24	24 24	21 21	22 22	23 23	23 23	23 23	18 18	17 17	15 15	25	196	38	259	36	25 12½	1	(a) 1,276 (b) 168 1 7 (c) 22 4 (d) 6 4 0½	—	Oct., June					
12	10	Mrs. R. Murphy, Newrath, Waterford.	10/4	91	4 11	D	22 20	21 21	19 19	20 20	25 24	22 22	22 22	19 19	30 30	—	—	69	117	25	211	47	20 11½	2	(a) 1,229 (b) 162 14 5 (c) 25 4 (d) 6 2 2½	—	June Oct., July				
			"	92	4 10	5 8	15 16	14 16	17 17	22 22	23 23	23 23	23 23	18 18	17 17	11 11	163	87	4	244	53	24 0	4	(a) 1,229 (b) 162 14 5 (c) 25 4 (d) 6 2 2½	—	Oct., July					
			"	93	5 0	4 8	15 16	14 16	17 17	22 22	23 23	23 23	23 23	18 18	17 17	11 11	163	87	3	195	49	24 0	4	(a) 1,229 (b) 162 14 5 (c) 25 4 (d) 6 2 2½	—	Aug., July					
			"	94	4 10	4 12	10 21	16 14	18 18	23 23	25 24	25 24	25 24	13 13	13 13	4 9	225	198	32	250	40	24 2½	1	(a) 1,229 (b) 162 14 5 (c) 25 4 (d) 6 2 2½	—	Aug., July					
			"	95	4 14	D	18 22	17 10	19 10	21 21	20 17	20 17	20 17	50 50	—	—	31	92	56	179	11	17 6	1	(a) 1,229 (b) 162 14 5 (c) 25 4 (d) 6 2 2½	—	July					
13	8	Mrs. L. P. Cox, Victoria Park, Donnycarmey, Co. Dublin.	12/2/34	43	4 12	4 14	26 23	22 20	22 22	23 23	27 24	25 24	24 24	24 24	21 21	24 24	24 24	49	226	6	281	74	23 24	2	(a) 1,243 (b) 162 4 6 (c) 25 1 (d) 6 1 0½	—	Aug., July				
			11/3/34	44	4 10	4 12	23 21	21 18	21 18	21 18	22 22	23 23	23 23	22 22	17 17	15 15	52	175	36	223	65	23 24	2	(a) 1,243 (b) 162 4 6 (c) 25 1 (d) 6 1 0½	—	June, July					
			12/2/34	46	4 10	5 6	21 20	19 20	19 20	19 20	21 21	18 18	18 18	17 17	18 18	18 18	1	184	44	229	31	22 5½	2	(a) 1,243 (b) 162 4 6 (c) 25 1 (d) 6 1 0½	—	June, June Oct., Mar., July					
			"	47	5 6	5 3	—	3 20	12 5	18 18	18 12	11 8	13 14	9 9	12 12	10 10	14	94	12	120	6	9 9½	2	(a) 1,243 (b) 162 4 6 (c) 25 1 (d) 6 1 0½	—	Nov., July, July					
			"	48	4 8	4 12	18 3	19 11	13 20	9 21	12 11	10 10	9 9	60 60	3 157	45 16 3	2 3	60	3	157	45	16 3	2	(a) 1,243 (b) 162 4 6 (c) 25 1 (d) 6 1 0½	—	July					
14	6	Mrs. C. P. Clearmley, Glennure, Baltimore, Co. Cork.	31/1/34	31	5 3	5 5	24 23	25 25	23 23	20 20	22 22	21 20	21 20	9 11	5 2	11 11	24	67	15	106	48	23 0	0	(a) 1,156 (b) 150 0 7 (c) 24 9 (d) 6 0 10½	—	July, July					
			10/2/34	32	5 12	5 12	21 21	19 16	18 18	13 13	13 13	11 11	11 11	11 11	2	24	53	49	168	38	13 13	1	(a) 1,156 (b) 150 0 7 (c) 24 9 (d) 6 0 10½	—	Aug., July						
			20/2/34	33	5 7	5 0	24 24	24 24	22 21	17 17	13 13	14 14	19 15	15 15	8 8	113	16	211	64	22 6½	2	(a) 1,156 (b) 150 0 7 (c) 24 9 (d) 6 0 10½	—	July							
			10/2/34	35	5 9	5 7	19 23	24 24	22 21	17 17	13 13	14 14	19 15	15 15	8 8	113	16	211	64	22 6½	2	(a) 1,156 (b) 150 0 7 (c) 24 9 (d) 6 0 10½	—	Aug., July							
			"	36	5 6	5 7	16 21	22 20	19 21	21 21	22 22	23 23	23 23	18 18	20 39	200 5	244	63	24	7	244	63	24 7	2	(a) 1,156 (b) 150 0 7 (c) 24 9 (d) 6 0 10½	—	July				
* 17	17	Mrs. M. O'Donnell, Fethard, Crimaleigh, Lifford, Co. Donegal.	21/3/34	97	5 0	5 8	25 28	24 21	20 21	20 21	23 24	25 24	25 24	25 24	21 21	20 20	—	13	192	8	213	71	22 3½	1	(a) 1,191 (b) 146 15 1 (c) 23 7 (d) 6 0 7½	—	Oct., July				
			"	98	4 8	4 4	23 17	22 22	15 21	20 21	23 24	25 24	25 24	17 15	15 15	—	23	161	26	210	63	21 4½	2	(a) 1,191 (b) 146 15 1 (c) 23 7 (d) 6 0 7½	—	Oct., July					
			"	99	4 8	4 8	21 16	25 24	15 21	20 21	23 24	25 24	25 24	17 15	15 15	—	7	124	56	183	55	20 6½	2	(a) 1,191 (b) 146 15 1 (c) 23 7 (d) 6 0 7½	—	Oct., July					
			"	100	4 10	4 5	25 13	24 24	24 24	22 21	23 24	25 24	25 24	17 15	15 15	—	5	110	120	244	54	22 0	1	(a) 1,191 (b) 146 15 1 (c) 23 7 (d) 6 0 7½	—	Oct., July					
			"	101	5 4	5 0	25 13	24 24	24 24	22 21	23 24	25 24	25 24	17 15	15 15	—	5	110	120	244	54	22 0	1	(a) 1,191 (b) 146 15 1 (c) 23 7 (d) 6 0 7½	—	Oct., Aug., July					
			"	102	4 8	D	23 26	22 19	19 19	D	—	—	—	—	—	—	—	—	—	109	100	—	—	(a) 1,191 (b) 146 15 1 (c) 23 7 (d) 6 0 7½	—	Oct.					

† Disqualified under Clause 28 (more than 20 per cent. second grade eggs). † Disqualified under Clause 25 (eggs failed to reach standard weight of 24 ozs. per dozen).

SECTION I.—WHITE WYANDOTTE—continued.

Order of Merit	NAME AND ADDRESS OF OWNER	Date of Hatching	No. of Pullets	WEIGHT		EGGS LAID														EGGS PER PULLET				EGGS UNDER PRESCRIBED WEIGHT				Date of Moulting, (Noting months in italics)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
				On arrival of test, lb. oz. lb. oz.	At close of test, lb. oz. lb. oz.	Oct. 1-Nov. 3	Nov. 4-Dec. 1	Dec. 2-Dec. 29	Jan. 30-Feb. 13	Feb. 24-Mar. 13	Mar. 24-Apr. 29	Apr. 30-May 13	May 14-June 15	June 16-July 18	July 14-Aug. 10	Aug. 11-Sept. 7	Special Grade	First Grade	Second Grade	Total	First Grade— (Oct. 1-Jan. 6)	Value per Pullet— 4 lb. oz. dr.	Average Weight of Eggs per Pullet	(a) Total Eggs from Pen.	(b) Total weight per dozen.	(c) Total value from Pen.	Eggs under prescribed weight		Number of times broody																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
16	14	Mr W Lawrence Clonmunch P Farm, Tullamore Offaly	70 80 81 82 83 84	5 7 5 8 5 8 5 6 5 6 4 11	4 6 5 4 5 4 4 10 4 11	Oct. 1-Nov. 3	Nov. 4-Dec. 1	Dec. 2-Dec. 29	Jan. 30-Feb. 13	Feb. 24-Mar. 13	Mar. 24-Apr. 29	Apr. 30-May 13	May 14-June 15	June 16-July 18	July 14-Aug. 10	Aug. 11-Sept. 7	Special Grade	First Grade	Second Grade	Total	20 01 21 21 22 21 23 21 24 21	2 0 2 1 2 1 2 2 2 2	(a) 1,202 lb. oz. dr. (b) 157 15 12 oz. (c) 25.2 0 6½	5	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

D=Dead. * Disqualified under Clause 28 (more than 20 per cent. second grade eggs).

† Disqualified under Clause 25 (eggs failed to reach standard weight of 24 ozs. per dozen).

U.T.=Untrapped.

Order of Merit	NAME AND ADDRESS OF OWNER	Date of Hatching	No. of Pullet	WEIGHT		EGGS LAID												EGGS PER PULLET				Value per Pullet	Average Weight of Eggs per Pullet	(a) Total Eggs from Pen.				Eggs under Prescribed Weight	Number of Broody	Date of Moulting (Neck moult in italics)
				On Ar-rival	At close of Test	Oct. 1-Nov. 8	Nov. 9-Dec. 1	Dec. 2-Dec. 29	Dec. 30-Jan. 26	Jan. 27-Feb. 23	Feb. 24-Mar. 23	Mar. 24-Apr. 20	Apr. 21-May 18	May 19-June 15	June 16-July 13	July 14-Aug. 10	Aug. 11-Sept. 7	Special Grade	First Grade	Second Grade	Total			First Grade—Oct. 1-Jan. 6	(b) Total weight.	(c) Av. weight per dozen.	(d) Total value from Pen.			
19	Miss P. Brady, Newtownrilly, Ceanannus Mor., Co. Meath.	25/2/84 18/2/84 3/2/84 5/2/84 "	5	4 11 4 9 4 4 4 12 4 8	4 12 4 6 4 6 4 14 D	16 16 15 17 15 17 1 21 1 21	16 16 15 17 15 17 1 21 1 21	16 16 15 17 15 17 1 21 1 21	16 16 15 17 15 17 1 21 1 21	16 16 15 17 15 17 1 21 1 21	16 16 15 17 15 17 1 21 1 21	16 16 15 17 15 17 1 21 1 21	16 16 15 17 15 17 1 21 1 21	16 16 15 17 15 17 1 21 1 21	16 16 15 17 15 17 1 21 1 21	16 16 15 17 15 17 1 21 1 21	16 16 15 17 15 17 1 21 1 21	16 16 15 17 15 17 1 21 1 21	Special Grade	First Grade	Second Grade	Total	First Grade—Oct. 1-Jan. 6	(a) 1,138 lb. oz. dr. (b) 137 7 6 (c) 24 6 (d) £5 12 13	1	— — — — —	July July Oct. July June June			
20	Miss P. White, Gortnaur P. F., Clonnell, Co. Tipperary.	1984 March " " " " "	24	4 8 4 11 4 11 4 10 4 11 4 11	5 6 5 2 5 6 5 8 5 6 5 8	16 16 15 17 15 17 9 24 12 18 11 6	16 16 15 17 15 17 9 24 12 18 11 6	16 16 15 17 15 17 9 24 12 18 11 6	16 16 15 17 15 17 9 24 12 18 11 6	16 16 15 17 15 17 9 24 12 18 11 6	16 16 15 17 15 17 9 24 12 18 11 6	16 16 15 17 15 17 9 24 12 18 11 6	16 16 15 17 15 17 9 24 12 18 11 6	16 16 15 17 15 17 9 24 12 18 11 6	16 16 15 17 15 17 9 24 12 18 11 6	16 16 15 17 15 17 9 24 12 18 11 6	16 16 15 17 15 17 9 24 12 18 11 6	16 16 15 17 15 17 9 24 12 18 11 6	Special Grade	First Grade	Second Grade	Total	First Grade—Oct. 1-Jan. 6	(a) 1,115 lb. oz. dr. (b) 154 2 7 (c) 26 5 (d) £4 9 0½	1 — — — — —	3 1 — — 2 1 1	Oct., Aug., June Oct., Aug. Oct., Aug. Oct., Aug., June Oct., June, June Oct., July, June Oct., July, June			
21	Mrs. W. D. Baker, Whitehall Towers, Rathbarnham, Co. Dublin.	7/8/84 " " " " "	8	4 8 4 8 4 8 4 11 4 8	4 13 5 4 5 4 5 12 4 12	16 16 20 24 20 24 13 21 20 10	16 16 20 24 20 24 13 21 20 10	16 16 20 24 20 24 13 21 20 10	16 16 20 24 20 24 13 21 20 10	16 16 20 24 20 24 13 21 20 10	16 16 20 24 20 24 13 21 20 10	16 16 20 24 20 24 13 21 20 10	16 16 20 24 20 24 13 21 20 10	16 16 20 24 20 24 13 21 20 10	16 16 20 24 20 24 13 21 20 10	16 16 20 24 20 24 13 21 20 10	16 16 20 24 20 24 13 21 20 10	16 16 20 24 20 24 13 21 20 10	Special Grade	First Grade	Second Grade	Total	First Grade—Oct. 1-Jan. 6	(a) 1,029 lb. oz. dr. (b) 139 14 2 (c) 26 1 (d) £5 2 11	102 — — — — —	1 4 — 3 — —	Aug. July June Aug. July July June Aug. June			
18	Mrs. E. M. O'Hara, Mornington, Crookedwood, Co. Westmeath.	1984 March " February March February "	108	4 11 4 11 4 7 5 8 5 7	5 8 4 6 6 10 5 12 5 10	18 16 16 9 16 9 21 11 20 9	18 16 16 9 16 9 21 11 20 9	18 16 16 9 16 9 21 11 20 9	18 16 16 9 16 9 21 11 20 9	18 16 16 9 16 9 21 11 20 9	18 16 16 9 16 9 21 11 20 9	18 16 16 9 16 9 21 11 20 9	18 16 16 9 16 9 21 11 20 9	18 16 16 9 16 9 21 11 20 9	18 16 16 9 16 9 21 11 20 9	18 16 16 9 16 9 21 11 20 9	18 16 16 9 16 9 21 11 20 9	18 16 16 9 16 9 21 11 20 9	Special Grade	First Grade	Second Grade	Total	First Grade—Oct. 1-Jan. 6	(a) 1,005 lb. oz. dr. (b) 134 9 13 (c) 25 7 (d) £4 16 4½	— 10 — — — — —	2 6 1 8 — 3	Aug. July Nov., Aug., June Nov., July Aug. July Nov., July, June Oct., July, June			
40	Mrs. M. Deegan, Roadside F. Farm, Lodge Park, Fresford, Co. Kilkenny.	1984 March " " " "	56	5 7 5 16 5 7 5 6 4 10	6 2 D D D D	19 21 21 10 21 23 17 25 5 10	19 21 21 10 21 23 17 25 5 10	19 21 21 10 21 23 17 25 5 10	19 21 21 10 21 23 17 25 5 10	19 21 21 10 21 23 17 25 5 10	19 21 21 10 21 23 17 25 5 10	19 21 21 10 21 23 17 25 5 10	19 21 21 10 21 23 17 25 5 10	19 21 21 10 21 23 17 25 5 10	19 21 21 10 21 23 17 25 5 10	19 21 21 10 21 23 17 25 5 10	19 21 21 10 21 23 17 25 5 10	19 21 21 10 21 23 17 25 5 10	Special Grade	First Grade	Second Grade	Total	First Grade—Oct. 1-Jan. 6	(a) 672 lb. oz. dr. (b) 89 11 10 (c) 25 6 (d) £5 7 0½	— — — — — —	5 1 — — — —	July Dec. — Feb. Aug., July Oct.			

*Disqualified under Clause 28 (more than 20 per cent. second grade eggs). † Disqualified under Clause 28 (Pen produced less than 1,020 eggs).

D=Dead.

* Disqualified under Clause 28 (more than 20 per cent second grade eggs).

SECTION II.—ANY SITTING BREED OTHER THAN WHITE WYANDOTTIE—continued

Order of Merit	Number of Pen	NAME AND ADDRESS OF OWNER	Date of Hatching	WEIGHT		EGGS LAID												EGGS PER PULLET		Average Weight of Eggs		(a) Total Eggs from Pen.				Number of times Broody	Date of Moulting (Neck moults in italics)																																																																																																																																																															
				On At close of trial	lb. oz. lb. oz.	Oct. 7-Nov. 3	Nov. 4-Dec. 1	Dec. 2-Dec. 20	Jan. 20-Feb. 20	Feb. 24-Mar. 23	Mar. 24-Apr. 20	Apr. 21-May 18	May 19-June 15	June 16-July 13	July 14-Aug. 10	Aug. 11-Sept. 7	Special Grade	First Grade	Second Grade	Total	Oct. 7-Jan. 6	Value per Pullet	s. d. oz. gr.	lb. oz. dr.	lb. oz. dr.			lb. oz. dr.	lb. oz. dr.																																																																																																																																																													
12	40	Rhode Island Red. Miss M. O'Donovan, Dromore, Villiersstown, Cappoquin, Co. Waterford.	1934 February " " " " "	271 272 273 274 275 276	5 7 4 12 5 2 5 11 5 2 5 13	D D 5 1 5 12 5 4 6 4	9 16 10 22 11	17 16 14 17 18	15 11 18 13 16	17 11 20 16 16	20 19 23 20 23	22 19 22 20 22	23 19 20 22 20	19 17 10 17 10	8 D 10 13 10	— — — — —	88 121 19 19 18	71 36 143 163 182	1 — 93 25 223	160 157 213 145 207 223	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14 36 15 47 21 36 15 26 17 20 11	30 14

D=Dead. * Disqualified under Clause 28 (more than 20 per cent. second grade eggs).

[illegible]

D=Dead. * Disqualified under Clause 28 (more than 20 per cent. second grade eggs). † Disqualified under Clause 28 (pen produced less than 1,020 eggs).

SECTION II.—ANY SITTING BREED OTHER THAN WHITE WYANDOTTES—continued.

Order of Merit	Number of Pen	NAME AND ADDRESS OF OWNER	Date of Hatching	No. of Pullets	WEIGHT		EGGS LAID												EGGS PER PULLET				Value per Pullet	Average Weight of Eggs per Pullet	(a) Total Eggs from Pen.				Bugs under Prescribed Weight	Number of Hens Broody	Date of Moulting (Nest, months in italics)	
					On Ar-rival of Test lb. oz.	At close of Test lb. oz.	Oct. 7-Nov. 3	Nov. 4-Dec. 1	Dec. 2-Dec. 29	Dec. 30-Jan. 29	Jan. 27-Feb. 23	Feb. 24-Mar. 23	Mar. 24-Apr. 20	Apr. 21-May 18	May 19-June 15	June 16-July 13	July 14-Aug. 10	Aug. 11-Sept. 7	Special Grade	First Grade	Second Grade	Total			First Grade—Oct. 7-Jan. 6	Total value from Pen.	Av. Weight per dozen.	Total weight from Pen.				
*1	55	White Sussex. Miss Pearl White, Gortoullar P. Farm, Channell, Co. Tipperary.	1934 March	325	5 0	D	19	19	12	—	—	—	—	—	—	—	13	5	10	2	24	51	—	—	—	—	—	—	—	—	Oct., Dec., Jan., Feb., July, Dec., Jan., Oct., June	
			"	326	5 0	5 9	19	21	5	—	—	—	—	—	—	—	13	36	11	12	159	55	—	—	—	—	—	—	—	—	Oct., Dec., Jan., Feb., July, Dec., Jan., Oct., June	
			"	327	4 12	5 4	12	17	18	10	10	18	12	17	8	9	12	10	10	40	193	12	—	—	—	—	—	—	—	—	Oct., Dec., Jan., Feb., July, Dec., Jan., Oct., June	
			"	328	5 8	5 10	14	16	6	—	—	23	25	20	19	21	22	12	169	38	206	7	—	—	—	—	—	—	—	—	—	Oct., Dec., Jan., Feb., July, Dec., Jan., Oct., June
			"	329	6 2	4 13	16	15	16	1	—	16	16	16	1	11	12	15	15	121	138	5	—	—	—	—	—	—	—	—	—	Oct., Dec., Jan., Feb., July, Dec., Jan., Oct., June
			"	330	4 8	4 8	—	—	9	19	22	18	19	18	4	11	—	117	43	2	163	31	—	—	—	—	—	—	—	—	—	Oct., Dec., Jan., Feb., July, Dec., Jan., Oct., June

D=Dead. * Disqualified under Clause 28 (more than 20 per cent. second grade eggs). † Disqualified under Clause 28 (don produced less than 1,020 eggs).

SECTION III.—ANY NON-SITTING BREED—15 PRIZES.

Order of Merit	Number of Pen	NAME AND ADDRESS OF OWNER	Date of Hatching	No. of Pullet	WEIGHT		EGGS LAID												EGGS PER PULLET				Average Weight of Eggs	(a) Total Eggs from Pen.				Eggs under Prescribed Weight	Number of times Broody	Date of Moulting (Neck months in italics)
					On Arival	At close of Test	Oct. 1-Nov. 3	Nov. 4-Dec. 1	Dec. 2-Dec. 10	Dec. 11-Jan. 10	Jan. 11-Feb. 10	Feb. 11-Mar. 10	Mar. 11-Apr. 10	Apr. 11-May 10	May 11-June 10	June 11-July 10	July 11-Aug. 10	Aug. 11-Sept. 7	Special Grade	First Grade	Second Grade	Total		First Grade—Oct. 1-Jan. 6	Total weight.	Av. weight per dozen.	Total value from pen.			
1	60	White Leghorn. Miss K. Cunningham, Monroe P. Farm, Naas, Co. Kildare.	25/3/34 " " 3/4/34 "	349 350 351 352 353 354	4 0 4 2 4 3 3 13 3 13	4 8 4 6 4 5 4 0 4 4	15 21 24 20 16	21 21 24 20 20	19 19 19 16 16	20 20 20 20 20	20 20 20 20 20	20 20 20 20 20	20 20 20 20 20	20 20 20 20 20	20 20 20 20 20	21 21 21 21 21	21 21 21 21 21	21 21 21 21 21	Special Grade	First Grade	Second Grade	Total	First Grade—Oct. 1-Jan. 6	(a) 1,387 (b) 172 0 11 (c) 192 0 11 (d) 266 6 (e) 46 12 5	(a) 1,387 (b) 172 0 11 (c) 192 0 11 (d) 266 6 (e) 46 12 5	— — — — — —	— — — — — —	— — — — — —	Oct., July Nov., July Aug., Aug. Aug., Aug. Oct., July	
2	65	White Leghorn. Miss S. M. O'Brien, Rookgrove P. F., Ring, Clonadilly, Co. Cork.	1934 February " " " "	385 386 387 388 389 390	4 13 3 11 4 12 4 6 4 0 4 2	4 5 3 8 4 2 4 2 3 8 4 1	21 16 15 21 16 21	20 18 18 16 17 22	20 23 22 11 —	21 21 21 21 21	20 20 20 20 20	20 20 20 20 20	20 20 20 20 20	20 20 20 20 20	20 20 20 20 20	20 20 20 20 20	20 20 20 20 20	20 20 20 20 20	Special Grade	First Grade	Second Grade	Total	First Grade—Oct. 1-Jan. 6	(a) 1,386 (b) 185 8 6 (c) 206 7 (d) 49 11 8	(a) 1,386 (b) 185 8 6 (c) 206 7 (d) 49 11 8	— — — — — —	— — — — — —	— — — — — —	Oct., July Dec., Feb., Aug., Oct., Jan., July, June, Feb., Aug.	
3	68	White Leghorn. Rev. Bro. Bergin, Our Lady Lourdes, Cahermoyle, Ardagh, Co. Limerick.	1934 March " " " "	727 728 729 730 731 732	4 10 4 7 4 4 4 4 4 1 4 3	4 12 4 8 4 8 4 0 4 0 4 0	15 19 20 20 17 17	18 18 18 18 16 16	19 18 18 18 17 17	20 20 20 20 20 20	20 20 20 20 20 20	20 20 20 20 20 20	20 20 20 20 20 20	20 20 20 20 20 20	20 20 20 20 20 20	20 20 20 20 20 20	20 20 20 20 20 20	20 20 20 20 20 20	Special Grade	First Grade	Second Grade	Total	First Grade—Oct. 1-Jan. 6	(a) 1,383 (b) 182 0 1 (c) 226 2 (d) 49 11 4 1/2	(a) 1,383 (b) 182 0 1 (c) 226 2 (d) 49 11 4 1/2	— — — — — —	— — — — — —	— — — — — —	June, June June, June Aug., July Aug., July Aug., July	
4	66	White Leghorn. Miss E. M. P. Keefe, St. Rita's P. Station, Lake Vale, Ballydesmond, Co. Cork.	1934 March " " " "	391 392 393 394 395 396	4 11 4 10 3 8 3 8 3 13 3 13	3 13 3 13 3 13 3 13 3 13 3 13	19 21 21 21 21 21	14 15 15 15 15 15	15 15 15 15 15 15	19 18 18 18 18 18	20 20 20 20 20 20	20 20 20 20 20 20	20 20 20 20 20 20	20 20 20 20 20 20	20 20 20 20 20 20	20 20 20 20 20 20	20 20 20 20 20 20	20 20 20 20 20 20	Special Grade	First Grade	Second Grade	Total	First Grade—Oct. 1-Jan. 6	(a) 1,168 (b) 160 10 10 (c) 279 9 (d) 45 19 8	(a) 1,168 (b) 160 10 10 (c) 279 9 (d) 45 19 8	— — — — — —	— — — — — —	— — — — — —	Oct., July Oct., Aug. Oct., Aug. June	
5	61	White Leghorn. Miss A. Fitzgerald, St. Rita's P. Station, Lake Vale, Ballydesmond, Co. Limerick.	3/3/34 " " " " "	355 356 357 358 359 360	4 6 4 0 4 0 4 5 4 2 4 2	4 6 4 0 4 0 4 8 4 2 4 2	21 19 19 19 19 19	24 18 18 18 18 18	22 22 22 22 22 22	20 20 20 20 20 20	20 20 20 20 20 20	20 20 20 20 20 20	20 20 20 20 20 20	20 20 20 20 20 20	20 20 20 20 20 20	20 20 20 20 20 20	20 20 20 20 20 20	20 20 20 20 20 20	Special Grade	First Grade	Second Grade	Total	First Grade—Oct. 1-Jan. 6	(a) 1,162 (b) 158 15 8 (c) 265 5 (d) 5 14 4 1/2	(a) 1,162 (b) 158 15 8 (c) 265 5 (d) 5 14 4 1/2	— — — — — —	— — — — — —	— — — — — —	Aug. June June, Aug. July Feb., Aug. Feb., Aug.	

D. = Dead

SECTION III.—ANY NON-SITTING BREED—continued.

Order of Merit	Number of Pen	NAME AND ADDRESS OF OWNER	Date of Hatching	No. of Pullets	WEIGHT		EGGS LAID												EGGS PER PULLET		Value per Pullet	Average Weight of Eggs per Pullet	Total Eggs from Pen.		Eggs under Prescribed Weight	Number of times Broody	Date of Moulting. (Neck moult in italics)
					On	At	Oct. 1-Nov. 3	Nov. 4-Dec. 1	Dec. 2-Dec. 10	Dec. 11-Jan. 10	Jan. 11-Feb. 10	Feb. 11-Mar. 10	Mar. 11-Apr. 10	Apr. 11-May 10	May 11-June 10	June 11-July 10	July 11-Aug. 10	Aug. 11-Sept. 10									
6	63	White Leghorn. Mrs. M. E. Higgins, Claremorris, Co. Mayo.	22/3/34	367	3 7	4 0	11	21	20	20	19	21	24	26	25	21	22	19	30	201	23	101	2	1	1	1	Oct., May, Aug., June
					3 12	4 0	14	21	20	20	19	21	23	23	22	21	18	21	158	83	24	31	4	4	1	1	Oct., May, Aug., June
					3 8	3 8	14	17	20	22	19	21	23	23	22	21	15	14	9	161	18	4	2	2	2	2	Oct., May, Aug., June
					3 70	3 8	14	17	20	22	19	21	23	23	22	21	15	14	9	161	18	4	2	2	2	2	Oct., May, Aug., June
					3 71	3 8	14	17	20	22	19	21	23	23	22	21	15	14	9	161	18	4	2	2	2	2	Oct., May, Aug., June
7	07	White Leghorn. Mrs. M. G. King, Beech Grove, Donadea, Co. Kildare.	1/4/34	372	3 8	3 10	6	22	23	21	22	23	23	23	22	21	18	10	138	47	15	109	4	4	1	1	Oct., May, Aug., June
					3 8	3 10	6	22	23	21	22	23	23	23	22	21	18	10	138	47	15	109	4	4	1	1	Oct., May, Aug., June
					3 8	3 10	6	22	23	21	22	23	23	23	22	21	18	10	138	47	15	109	4	4	1	1	Oct., May, Aug., June
					3 8	3 10	6	22	23	21	22	23	23	23	22	21	18	10	138	47	15	109	4	4	1	1	Oct., May, Aug., June
					3 8	3 10	6	22	23	21	22	23	23	23	22	21	18	10	138	47	15	109	4	4	1	1	Oct., May, Aug., June
8	63	White Leghorn. Mrs. B. Horridge, Tullarris P. Farm, Blessington, Co. Wicklow.	14/2/34	373	4 8	4 0	10	21	20	18	18	20	21	19	10	18	16	15	164	68	2	224	4	4	1	1	Oct., Aug., Aug., July
					4 8	4 0	10	21	20	18	18	20	21	19	10	18	16	15	164	68	2	224	4	4	1	1	Oct., Aug., Aug., July
					4 6	4 0	10	21	20	18	18	20	21	19	10	18	16	15	164	68	2	224	4	4	1	1	Oct., Aug., Aug., July
					4 10	4 0	10	21	20	18	18	20	21	19	10	18	16	15	164	68	2	224	4	4	1	1	Oct., Aug., Aug., July
					4 2	4 0	10	21	20	18	18	20	21	19	10	18	16	15	164	68	2	224	4	4	1	1	Oct., Aug., Aug., July
9	04	White Leghorn. Mrs. J. McCarthy, Gaberelli Castle, Grange, Keshlock, Co. Limerick.	25/2/34	375	4 8	4 2	18	22	19	18	17	18	21	20	19	18	14	11	108	48	3	232	1	1	1	1	Aug., Aug., Feb., July
					4 12	4 2	18	22	19	18	17	18	21	20	19	18	14	11	108	48	3	232	1	1	1	1	Aug., Aug., Feb., July
					4 12	4 2	18	22	19	18	17	18	21	20	19	18	14	11	108	48	3	232	1	1	1	1	Aug., Aug., Feb., July
					4 12	4 2	18	22	19	18	17	18	21	20	19	18	14	11	108	48	3	232	1	1	1	1	Aug., Aug., Feb., July
					4 12	4 2	18	22	19	18	17	18	21	20	19	18	14	11	108	48	3	232	1	1	1	1	Aug., Aug., Feb., July
10	70	White Leghorn. Mrs. J. Simpson, Crimmity, Grange, Co. Tipperary.	27/3/34	415	3 11	3 11	20	20	18	17	16	16	19	20	20	19	18	15	144	77	12	144	2	2	1	1	Aug., Aug., Feb., July
					3 11	3 11	20	20	18	17	16	16	19	20	20	19	18	15	144	77	12	144	2	2	1	1	Aug., Aug., Feb., July
					3 11	3 11	20	20	18	17	16	16	19	20	20	19	18	15	144	77	12	144	2	2	1	1	Aug., Aug., Feb., July
					3 11	3 11	20	20	18	17	16	16	19	20	20	19	18	15	144	77	12	144	2	2	1	1	Aug., Aug., Feb., July
					3 11	3 11	20	20	18	17	16	16	19	20	20	19	18	15	144	77	12	144	2	2	1	1	Aug., Aug., Feb., July

D=Dead.

Order of Merit	Number of Pen	NAME AND ADDRESS OF OWNER	Date of Hatching	No. of Pullet	WEIGHT		EGGS LAID												EGGS PER PULLEY				Value per Pullet	Average Weight of Eggs	Total Eggs from Pen.				Eggs under Prescribed Weight	Number of times Broody	Date of Moulting (Neck moults in italics)
					On Arrival lb. oz.	At close of Test lb. oz.	Nov. 2-Dec. 3	Nov. 4-Dec. 1	Dec. 2-Dec. 20	Dec. 21-Jan. 20	Jan. 21-Feb. 23	Feb. 24-Mar. 23	Mar. 24-Apr. 20	Apr. 21-May 15	May 16-June 15	June 16-July 13	July 14-Aug. 10	Aug. 11-Sept. 7	Special Grade	First Grade	Second Grade	Total			Oct. 7-Jan. 5	(a)	(b)	(c)				(d)
1	60	White Leghorn. Miss K. Cunningham, Monroe P. Farm, Nans, Co. Kildare.	25/3/34	319	4 0	4 4	15 21	21 21	21 21	21 21	21 21	21 21	21 21	21 21	21 21	21 21	21 21	21 21	135	39	6	236	12 12	(a) 1387	(b) 102 0 11	(c) 266	(d) 26 12 5	4	1	Oct., July	
			"	320	4 2	4 8	15 21	21 21	21 21	21 21	21 21	21 21	21 21	21 21	21 21	21 21	21 21	21 21	21 21	135	39	6	236	12 12	(a) 1387	(b) 102 0 11	(c) 266	(d) 26 12 5	4	1	Nov., July
			"	351	4 3	4 6	24 24	24 24	24 24	24 24	24 24	24 24	24 24	24 24	24 24	24 24	24 24	24 24	24 24	135	39	6	236	12 12	(a) 1387	(b) 102 0 11	(c) 266	(d) 26 12 5	4	1	Aug.
			3/4/34	352	4 2	4 6	24 24	24 24	24 24	24 24	24 24	24 24	24 24	24 24	24 24	24 24	24 24	24 24	24 24	135	39	6	236	12 12	(a) 1387	(b) 102 0 11	(c) 266	(d) 26 12 5	4	1	Oct., July
2	65	White Leghorn. Miss S. M. O'Brien, Rockgrove P. F., Ring, Clonakilly, Co. Cork.	1934	385	4 13	4 5	21 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	135	31	3	251	11 11	(a) 1386	(b) 185 8 6	(c) 267	(d) 26 11 8	4	1	Oct., July	
			February	386	3 11	3 8	15 16	11 11	11 11	11 11	11 11	11 11	11 11	11 11	11 11	11 11	11 11	11 11	11 11	135	31	3	251	11 11	(a) 1386	(b) 185 8 6	(c) 267	(d) 26 11 8	4	1	Dec., Feb.
			"	387	4 12	4 2	15 16	11 11	11 11	11 11	11 11	11 11	11 11	11 11	11 11	11 11	11 11	11 11	11 11	135	31	3	251	11 11	(a) 1386	(b) 185 8 6	(c) 267	(d) 26 11 8	4	1	Aug.
			"	388	4 6	4 2	21 19	15 13	13 13	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	135	31	3	251	11 11	(a) 1386	(b) 185 8 6	(c) 267	(d) 26 11 8	4	1	Oct., July
3	68	White Leghorn. Rev. Bro. Bergin, Our Lady of Lourdes, Cahernoy, Ardsagh, Co. Limerick.	1934	727	4 10	4 12	15 18	15 18	15 18	15 18	15 18	15 18	15 18	15 18	15 18	15 18	15 18	15 18	135	143	5	233	11 11	(a) 1383	(b) 182 0 1	(c) 262	(d) 26 11 41	4	1	June, June	
			March	728	4 7	4 8	20 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	135	143	5	233	11 11	(a) 1383	(b) 182 0 1	(c) 262	(d) 26 11 41	4	1	Aug., June
			"	729	4 4	4 0	20 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	135	143	5	233	11 11	(a) 1383	(b) 182 0 1	(c) 262	(d) 26 11 41	4	1	Aug., July
			"	730	4 1	4 0	17 16	17 15	15 15	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	135	143	5	233	11 11	(a) 1383	(b) 182 0 1	(c) 262	(d) 26 11 41	4	1	Aug., July
4	66	White Leghorn. Miss E. M. O'Keefe, St. Rita's P. Station, Lake Vale, Ballydoonond, Co. Cork.	1934	391	4 11	3 13	19 14	15 13	15 13	15 13	15 13	15 13	15 13	15 13	15 13	15 13	15 13	15 13	135	92	31	123	11 11	(a) 1468	(b) 168 10 10	(c) 270	(d) 27 10 8	4	1	Oct., July	
			March	392	3 10	3 13	22 21	18 17	18 17	18 17	18 17	18 17	18 17	18 17	18 17	18 17	18 17	18 17	18 17	135	92	31	123	11 11	(a) 1468	(b) 168 10 10	(c) 270	(d) 27 10 8	4	1	Oct., Aug.
			"	393	4 0	3 8	21 17	17 14	17 14	17 14	17 14	17 14	17 14	17 14	17 14	17 14	17 14	17 14	17 14	135	92	31	123	11 11	(a) 1468	(b) 168 10 10	(c) 270	(d) 27 10 8	4	1	Dec., June
			"	394	3 8	3 13	18 15	15 13	15 13	15 13	15 13	15 13	15 13	15 13	15 13	15 13	15 13	15 13	15 13	135	92	31	123	11 11	(a) 1468	(b) 168 10 10	(c) 270	(d) 27 10 8	4	1	June
5	61	White Leghorn. Miss A. Fitzgerald, Ardgoul, Rathclee, Co. Limerick.	3/3/34	355	4 6	4 6	21 24	22 20	22 20	22 20	22 20	22 20	22 20	22 20	22 20	22 20	22 20	22 20	135	47	29	237	11 11	(a) 1462	(b) 168 10 10	(c) 265	(d) 26 11 41	4	1	Aug.	
			"	356	4 0	4 8	19 18	19 14	17 18	17 18	17 18	17 18	17 18	17 18	17 18	17 18	17 18	17 18	17 18	135	47	29	237	11 11	(a) 1462	(b) 168 10 10	(c) 265	(d) 26 11 41	4	1	June
			"	357	4 0	4 8	19 18	19 14	17 18	17 18	17 18	17 18	17 18	17 18	17 18	17 18	17 18	17 18	17 18	135	47	29	237	11 11	(a) 1462	(b) 168 10 10	(c) 265	(d) 26 11 41	4	1	July, Aug.
			"	358	4 2	3 12	19 23	21 20	21 20	21 20	21 20	21 20	21 20	21 20	21 20	21 20	21 20	21 20	21 20	135	47	29	237	11 11	(a) 1462	(b) 168 10 10	(c) 265	(d) 26 11 41	4	1	Feb., Aug.

D. = Dead

SECTION III.—ANY NON-SITTING BREED—continued.

Order of Merit	NAME AND ADDRESS OF OWNER	Date of Hatching	No. of Pullets	WEIGHT		EGGS LAID												EGGS PER PULLEY			Value per Pullet	Average Weight of Eggs per Pullet	Total Eggs from Pen.				Eggs under Prescribed Weight	Number of Times Broody	Date of Maturity (Week months in italics)																																																																																																																																																																																																																																																																																																																																																																																																																																								
				On arrival of test	At close of test	Oct. 7-Nov. 8	Nov. 8-Dec. 1	Dec. 2-Dec. 29	Dec. 30-Jan. 26	Jan. 27-Feb. 23	Feb. 24-Mar. 23	Mar. 24-Apr. 20	Apr. 21-May 15	May 16-June 15	June 16-July 13	July 14-Aug. 10	Aug. 11-Sept. 7	Special Grade	First Grade	Second Grade			Total	First Grade	Total	Total				Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total

D=Dead.

Order of Merit	NAME AND ADDRESS OF OWNER	Date of Hatching	WEIGHT		EGGS LAID												EGGS PER PULLEY			Average Weight of Eggs per Pullet	(a) Total Eggs from Pen.	(b) Total weight from Pen.	(c) Av. weight per dozen.	(d) Total value from Pen.	Number of times Broody	Date of Moulting (check months in italics)		
			No. of Pullets	On Arrival	At close of Test	Nov. 1-Nov. 3	Dec. 1-Dec. 29	Dec. 30-Jan. 29	Jan. 30-Feb. 28	Feb. 29-Mar. 28	Mar. 29-Apr. 28	Apr. 29-May 18	May 19-June 18	June 19-July 18	July 19-Aug. 10	Aug. 11-Sept. 7	First Grade		Second Grade								Total	First Grade—Oct. 7-Jan. 6
																	lb.	oz.											lb.	oz.
11	White Leghorn. Mrs. L. Ahern, "The Garrison," Ballynacody, Mallow, Co. Cork.	1884 March	331	4 8	4 0	21	21	5	7	19	24	13	22	16	125	75	5	295	63	(a) 1,061 (b) 147 12 1 (c) 26.7 (d) 4 5 3 1 1	2	Jan., June, June						
12	White Leghorn. Mrs. M. A. Walsh, Wardstown, Ahhboy, Co. Meath.	1/4/84	421	3 8	4 0	20	18	4	20	21	24	24	24	19	47	152	31	220	33	(a) 1,463 (b) 141 10 0 (c) 23.9 (d) 4 5 2 2	1	Jan., Aug., Nov., Feb., Aug.						
†	White Leghorn. Mrs. M. E. Shanley, Dromod, Co. Roscommon.	6/3/84 " " " 8/3/84 "	409	4 0	4 0	15	9	11	11	10	13	14	12	10	72	45	1	118	28	(a) 945 (b) 134 12 15 (c) 27.4 (d) 4 4 13 10 1	—	Oct., Aug., Oct., Jan., Oct., Aug., Oct., July, Oct., July						
†	White Leghorn. Mrs. L. Burns, Santry Hall, Co. Dublin.	1884 March " " April, March	337	3 14	3 6	11	3	16	7	8	15	10	22	20	72	62	11	145	24	(a) 1,001 (b) 145 1 8 (c) 27.8 (d) 4 3 13 5 1	—	Jan., July, July, Oct., July, July, Oct., Jan., July						
†	Black Minorca. Mrs. R. Cochrane, Tullyroe, Co. Roscommon.	9/3/84 " 2/4/84 18/2/84 9/4/84	343	3 10	3 8	1	19	21	17	18	17	13	16	14	16	143	28	187	32	(a) 873 (b) 113 7 8 (c) 24.9 (d) 4 3 10 5	2	Aug., July, July, Jan., Oct., June						

D=Dead. * Disqualified under Clause 28 (more than 20 per cent. second grade eggs). † Disqualified under Clause 28 (pen produced less than 1,000 eggs). U.T.—Untrapped.

SECTION IV.—WHITE WYANDOTTES (STATION HOLDERS)—IN PENN.

Order of Merit	NAME AND ADDRESS OF OWNER	Date of Hatching	No. of Pullets	WEIGHT		EGGS LAID										EGGS PER PULLEY		Value of Pullets		Average Weight of Eggs per Pullet		(a) Total Eggs from Pen				Date of Shipment in this class
				On arrival	At close of test	Oct. 1-Nov. 3	Nov. 4-Dec. 1	Dec. 2-Jan. 2	Jan. 3-Feb. 2	Feb. 3-Mar. 2	Mar. 3-Apr. 2	Apr. 3-May 2	May 3-June 2	June 3-July 2	July 3-Aug. 2	Aug. 3-Sept. 2	Total	First Grade	Second Grade	Third Grade	(b) Total weight	(c) Av. weight per dozen	(d) Total value twenty per cent.			
1	Mrs. M. Lynch, Knockree, Passage East, Co. Waterford.	1884	487	4 11	1 8	2 15	22	22	18	8	23	23	18	8	11	15	172	17	1	125	60	1 230	60	Oct., July, June		
		"	488	5 6	4 1	22	18	16	18	20	19	23	19	11	8	11	203	18	1	154	60	1 00 13 13	60	Oct., July, June		
		"	489	5 3	4 7	14	22	24	22	25	24	4	7	4	6	13	188	30	1	198	60	1 00 13 13	60	Oct., April, June		
		"	490	5 2	4 12	21	22	22	18	19	24	23	20	15	16	12	220	58	5	162	60	1 00 13 13	60	Oct., June, June		
		"	491	5 6	4 12	21	22	22	19	21	19	20	18	16	6	10	160	58	5	160	60	1 00 13 13	60	Oct., June, June		
2	Mrs. R. B. Radle, The Poplars, Beaufort, Co. Kerry.	"	492	5 4	4 4	20	24	22	24	23	23	25	22	22	10	18	257	79	26	43	60	1 235	60	Oct., July, June		
		31/3/34	469	4 11	4 12	12	20	22	21	10	19	20	14	22	9	21	180	18	180	13	60	1 177	60	Oct., July, June		
		"	470	4 12	4 14	12	20	22	22	21	24	22	26	21	18	10	223	8	223	104	60	1 177	60	Oct., Aug., July		
		"	471	4 10	5 12	14	22	22	19	23	23	23	23	22	10	13	221	1	221	84	60	1 257	60	Oct., July, June		
		"	472	4 10	5 8	14	22	22	23	21	23	24	19	13	12	21	206	43	20	41	60	1 246	60	Oct., July, June		
3	Miss M. Byrne, Knockree, Roscrea, Co. Tipperary.	"	473	4 10	4 4	20	22	22	19	21	21	24	21	21	19	17	253	28	253	61	60	1 257	60	Oct., July, June		
		"	474	4 14	4 10	24	22	22	19	21	21	22	22	16	14	5	14	102	112	225	7	60	1 246	60	Oct., Aug., June	
		1084	433	4 12	4 16	10	24	22	23	22	23	23	19	9	6	18	37	140	8	185	38	60	1 234	60	Oct., June	
		"	434	4 10	5 10	19	20	24	21	18	20	22	15	8	11	16	95	67	1	103	39	60	1 16	60	Oct., July	
		"	435	5 4	5 10	20	24	22	22	17	22	22	17	16	13	11	131	1	6	219	47	60	1 11	60	Oct., June	
4	Miss R. Newman, Drinaddy, Co. Meath.	"	436	4 14	4 14	20	24	22	21	20	22	22	17	17	16	11	100	63	252	17	60	1 15	60	Oct., July		
		"	437	4 14	5 2	8	24	22	20	19	17	22	24	23	12	6	106	146	1	213	35	60	1 14	60	Oct., July, June	
		1084	511	5 1	6 0	16	24	22	23	22	23	23	19	9	6	18	37	140	8	185	38	60	1 234	60	Oct., June	
		"	512	5 2	4 13	24	20	24	21	18	20	22	15	8	11	16	95	67	1	103	39	60	1 16	60	Oct., July	
		"	513	5 8	5 4	9	16	12	19	18	14	16	14	13	13	13	140	21	6	219	47	60	1 163	60	Oct., June	
5	Miss C. M. Brogan, Phillstown House, Co. Meath.	January	514	5 8	5 4	9	16	12	19	18	16	16	15	15	15	15	109	76	17	262	43	60	1 163	60	Oct., June	
		March	515	5 11	7 8	22	20	24	18	16	14	20	15	15	15	15	109	76	17	262	43	60	1 163	60	Oct., June	
		"	516	5 4	6 4	25	22	22	21	22	25	25	26	24	23	25	11	174	77	262	17	60	1 163	60	Oct., June	
		21/2/34	715	5 2	6 6	16	24	22	23	21	25	25	23	21	21	21	352	12	4	268	93	60	1 185	60	Aug., June	
		"	716	4 12	6 0	17	24	22	23	21	25	25	23	21	21	21	352	12	4	268	93	60	1 185	60	Aug., June	
6	Miss C. M. Brogan, Phillstown House, Co. Meath.	"	717	5 6	4 12	16	24	22	23	21	25	25	23	21	21	352	12	4	268	93	60	1 185	60	Aug., June		
		21/3/34	718	4 12	5 8	15	21	21	23	21	19	24	15	16	20	10	170	17	226	36	60	1 156	60	Nov., July, June		
		"	719	4 11	5 4	17	20	22	16	23	17	18	16	18	10	10	144	144	102	6	60	1 156	60	Oct., Aug., June		
		28/2/34	720	4 12	5 12	11	6	18	21	23	23	23	23	23	11	6	202	40	202	9	60	1 156	60	Oct., Aug., June		
		"	721	4 12	5 12	11	6	18	21	23	23	23	23	23	11	6	202	40	202	9	60	1 156	60	Oct., Aug., June		

1. Dead. * Disqualified under Clause 28 (more than 20 per cent. second grade eggs).

Order of Merit	Number of Pen	NAME AND ADDRESS OF OWNER	Date of Hatching	WEIGHT		EGGS LAID										EGGS PER PULLET		Value per Pullet	Average Weight of Eggs per Pullet	(a) Total Eggs from Pen.				Eggs under Prescribed Weight	Number of times Broody	Date of Moulting (Noted results in italics)
				No. of Pullet	On Ar-rival of test	At close of test	Oct. 1-Nov. 3	Nov. 4-Dec. 1	Dec. 2-Jan. 19	Dec. 20-Jan. 19	Jan. 20-Feb. 19	Feb. 20-Mar. 19	Mar. 20-Apr. 19	Apr. 20-May 19	May 20-June 19	June 20-July 19	July 20-Aug. 19	Aug. 20-Sept. 19								
5	80	Mrs. C. Roche, Carrigrohilly, Ballynascorney, Boyle, Co. Roscommon.	22/3/34	529	5 6	6 4	18 14	19 14	20 14	21 14	22 14	23 14	24 14	25 14	26 14	27 14	28 14	29 14	30 14	31 14	32 14	33 14	34 14	35 14	36 14	37 14
			"	530	5 6	6 4	18 14	19 14	20 14	21 14	22 14	23 14	24 14	25 14	26 14	27 14	28 14	29 14	30 14	31 14	32 14	33 14	34 14	35 14	36 14	37 14
			"	531	5 6	6 4	18 14	19 14	20 14	21 14	22 14	23 14	24 14	25 14	26 14	27 14	28 14	29 14	30 14	31 14	32 14	33 14	34 14	35 14	36 14	37 14
			"	532	5 6	6 4	18 14	19 14	20 14	21 14	22 14	23 14	24 14	25 14	26 14	27 14	28 14	29 14	30 14	31 14	32 14	33 14	34 14	35 14	36 14	37 14
			"	533	5 6	6 4	18 14	19 14	20 14	21 14	22 14	23 14	24 14	25 14	26 14	27 14	28 14	29 14	30 14	31 14	32 14	33 14	34 14	35 14	36 14	37 14
6	77	Miss M. Cremin, Grinavorg, Newmarket, Co. Cork.	15/1/34	451	4 15	4 14	18 14	19 14	20 14	21 14	22 14	23 14	24 14	25 14	26 14	27 14	28 14	29 14	30 14	31 14	32 14	33 14	34 14	35 14	36 14	37 14
			"	452	4 10	5 6	9 21	14 7	18 22	22 18	22 18	22 18	22 18	22 18	22 18	22 18	22 18	22 18	22 18	22 18	22 18	22 18	22 18	22 18	22 18	22 18
			20/3/34	453	4 11	4 6	19 20	20 25	21 25	21 25	21 25	21 25	21 25	21 25	21 25	21 25	21 25	21 25	21 25	21 25	21 25	21 25	21 25	21 25	21 25	21 25
			"	454	5 1	5 8	17 18	18 20	19 22	20 22	21 22	22 22	23 22	24 22	25 22	26 22	27 22	28 22	29 22	30 22	31 22	32 22	33 22	34 22	35 22	36 22
			"	455	4 12	5 1	20 19	17 18	18 17	19 16	20 15	21 14	22 13	23 12	24 11	25 10	26 9	27 8	28 7	29 6	30 5	31 4	32 3	33 2	34 1	35 0
7	84	Miss M. O'Brien, Moycarkey, Thurles, Co. Tipperary.	1934 February	517	5 4	6 2	24 22	20 19	21 17	22 16	23 15	24 14	25 13	26 12	27 11	28 10	29 9	30 8	31 7	32 6	33 5	34 4	35 3	36 2	37 1	38 0
			"	518	4 10	5 6	24 22	20 19	21 17	22 16	23 15	24 14	25 13	26 12	27 11	28 10	29 9	30 8	31 7	32 6	33 5	34 4	35 3	36 2	37 1	38 0
			"	519	4 14	5 4	21 23	19 19	20 19	21 19	22 19	23 19	24 19	25 19	26 19	27 19	28 19	29 19	30 19	31 19	32 19	33 19	34 19	35 19	36 19	37 19
			"	520	4 13	5 8	21 23	19 19	20 19	21 19	22 19	23 19	24 19	25 19	26 19	27 19	28 19	29 19	30 19	31 19	32 19	33 19	34 19	35 19	36 19	37 19
			"	521	4 12	5 12	18 17	17 16	18 17	19 16	20 15	21 14	22 13	23 12	24 11	25 10	26 9	27 8	28 7	29 6	30 5	31 4	32 3	33 2	34 1	35 0
8	70	Mrs. M. Mullaney, Ballynacorney, Carrigrohilly, Co. Tipperary.	1934 February	493	4 13	4 10	21 19	17 15	18 14	19 13	20 12	21 11	22 10	23 9	24 8	25 7	26 6	27 5	28 4	29 3	30 2	31 1	32 0	33 0	34 0	35 0
			"	494	4 14	4 10	20 18	18 17	19 16	20 15	21 14	22 13	23 12	24 11	25 10	26 9	27 8	28 7	29 6	30 5	31 4	32 3	33 2	34 1	35 0	36 0
			"	495	4 14	4 10	20 18	18 17	19 16	20 15	21 14	22 13	23 12	24 11	25 10	26 9	27 8	28 7	29 6	30 5	31 4	32 3	33 2	34 1	35 0	36 0
			"	496	5 7	5 14	24 22	20 19	21 19	22 19	23 19	24 19	25 19	26 19	27 19	28 19	29 19	30 19	31 19	32 19	33 19	34 19	35 19	36 19	37 19	38 0
			"	497	5 3	5 13	20 20	21 20	22 20	23 20	24 20	25 20	26 20	27 20	28 20	29 20	30 20	31 20	32 20	33 20	34 20	35 20	36 20	37 20	38 0	39 0
9	81	Mrs. M. Mullaney, Ballynacorney, Carrigrohilly, Co. Tipperary.	1934 February	498	4 11	5 2	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8
			"	499	4 11	5 2	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8
			"	500	4 11	5 2	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8
			"	501	4 11	5 2	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8
			"	502	4 11	5 2	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8	13 8

D = Dead. * Disqualified under Clause 28 (more than 20 per cent. second grade eggs).

SECTION IV.—WHITE WYANDOTTE (STATION HOLDERS)—continued.

Order of Merit	NAME AND ADDRESS OF OWNER	Date of Hatching	WEIGHT		EGGS LAID												EGGS PER PULLETT				Average Weight of Eggs per Pullet	(a) Total Eggs from Pen.		Date of Moulting (Neck moult in italics)
			No. of Pullets	On Arrival of Test	Oct. 7-Nov. 3	Nov. 4-Dec. 1	Dec. 2-Dec. 20	Dec. 30-Jan. 26	Jan. 27-Feb. 23	Feb. 24-Mar. 23	Mar. 24-Apr. 20	Apr. 21-May 18	May 19-June 15	June 16-July 13	July 14-Aug. 10	Aug. 11-Sept. 7	Special Grade	First Grade	Second Grade	Total		First Grade—Oct. 7-Jan. 6	Value per Pullet	
9	Miss A. Hanley, Cappa House, Cahir, Co. Tipperary.	2/3/34 13/2/34 2/3/34 13/2/34	481 482 483 484 485 486	5 1 5 4 4 12 4 14 4 15 4 15	5 3 5 4 5 6 5 0 4 0 22	18 15 15 6 11 8	17 15 15 23 16 21	24 15 23 22 16 21	23 24 22 22 19 21	25 22 22 22 19 23	22 24 20 23 11 23	23 24 20 13 11 6	15 15 19 19 6 11	15 15 19 19 6 11	182 179 167 205 6 44	34 30 106 7 131 8	218 177 177 19 183	33 30 106 7 131 8	1,107 1,107 1,107 2,200 2,200 2,200	1 1 1 1 1 1	Oct., June Oct., July Oct., July Oct., July Oct., June			
*	Mrs. R. Elkin, Leatrin House, Lecanoy, Noville, Co. Donegal.	3/3/34 16/3/34 " " "	475 476 477 478 479 480	4 7 4 12 5 4 4 6 4 0 5 4	5 5 4 8 5 0 6 0 7 0 5 6	— 22 24 14 17 —	14 20 24 19 17 10	23 18 24 18 10 25	15 17 23 20 22 14	15 26 27 20 22 14	15 26 27 20 22 14	12 19 20 14 24 16	13 19 20 18 24 16	13 19 20 18 24 16	118 118 118 150 150 118	15 201 91 72 189 57	136 258 103 14 234 118	43 62 113 51 234 —	1,141 1,141 1,141 240 240 240	6 1 2 3 5 3	Feb., June June Aug., June Oct., June June			
†	Miss M. M. Bowe, Graiguevalla House, Errill, Ballybrophy, Laoighis.	3/3/34 " " " " January	427 428 429 430 431 432	4 13 4 8 4 8 4 10 4 4 4 8	5 0 4 2 4 8 4 12 4 4 4 1	25 24 24 20 18 22	22 15 23 23 23 20	23 15 23 23 23 14	16 16 22 20 16 20	18 16 22 20 17 20	18 16 22 20 17 20	23 17 23 23 14 21	23 17 23 23 14 21	23 17 23 23 14 21	4 6 6 2 0 11	180 34 110 108 148 67	224 88 205 148 148 96	46 40 205 148 148 26	224 100 72 148 148 26	957 957 957 957 957 957	1 1 1 1 1 1	Aug., June Oct., June Oct., June July, June		
†	Mr. A. Mackey, Talaght, Co. Dublin.	— — — — — —	709 710 711 712 713 714	5 1 4 14 5 6 5 3 5 3 4 8	5 2 4 6 4 6 4 6 4 8 D	19 19 19 13 20 16	21 23 23 19 20 —	21 23 23 23 23 15	18 22 22 22 22 —	17 20 20 17 15 —	20 20 20 17 15 —	15 19 11 11 14 5	15 11 11 17 20 5	15 19 11 11 14 20	35 35 35 35 35 35	174 174 174 174 174 174	32 32 32 32 32 32	942 942 942 942 942 942	1 1 1 1 1 1	Oct., June July June Oct., May July Nov., July				
†	Mrs. M. P. Curville, Carrickshane House, Castleblayney, Co. Monaghan.	29/2/34 " " " " "	439 440 441 442 443 444	4 12 4 14 4 14 4 8 4 8 4 12	5 4 4 9 4 9 D D 5 0	— 17 17 24 24 24	22 20 21 22 22 22	20 18 20 22 22 15	19 19 17 23 23 11	20 17 14 10 10 23	20 17 14 10 10 23	2 14 11 11 14 5	2 14 11 11 14 5	2 14 11 11 14 5	69 103 103 245 12 136	104 130 130 245 57 136	175 175 175 245 12 146	175 175 175 245 12 146	944 944 944 257 257 257	5 1 1 1 1 1	May, Aug. Oct., May Oct., May Feb. Nov., Dec. Aug.			

1 Dead. * Disqualified under Clause 28 (more than 20 per cent. second grade eggs). † Disqualified under Clause 28 (Eva produced less than 1,420 eggs).

SECTION IV.—WHITE WYANDOTTE (STATION HOLDERS)—continued.

Order of Merit	Number of Pen	NAME AND ADDRESS OF OWNER	Date of Hatching	No. of Pullet	WEIGHT		EGGS LAID												EGGS PER PULLET				Value per Pullet	Average Weight of Eggs	(a) Total Eggs from Pen.				Bugs under Prescribed Weight	Number of times Broody	Date of Moulting. (Neck moult in italics)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
					On Ar-rival	At close of test	Oct. 7-Nov. 3	Nov. 4-Dec. 1	Dec. 2-Dec. 29	Dec. 30-Jan. 28	Jan. 27-Feb. 23	Feb. 24-Mar. 23	Mar. 24-Apr. 20	Apr. 21-May 18	May 19-June 13	June 16-July 13	July 14-Aug. 10	Aug. 11-Sept. 7	Special Grade	First Grade	Second Grade	Total			Oct. 7-Jan. 6	(b) Total weight.	(c) Av. weight per dozen.	(d) Total value from Pen.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
†	76	Mrs. M. Coleran, Cranaghmore, Athlone, Co. Roscommon.	20/1/34 " " " " " " " "	445	4 10	D	16	21	19	19	18	19	8	D	—	—	—	89	31	—	120	60	14	101	2 3 8	(a) 923	lb. oz. dr.	(b) 124 5 1	(c) 257.7	(d) £4 14 0½	—	1	Oct., July, June																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
				446	5 4	4 14	—	—	—	7 15	22	17	13	10	—	—	—	66	24	—	90	—	—	—	—	—	—	—	—	—	—	—	—	Oct., June																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
				447	4 8	4 4	20	21	21	23	18	19	22	14	21	17	16	177	54	3	284	68	24	21	2 2 1	—	—	—	—	—	—	—	—	Oct., June																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
				448	4 8	5 2	18	13	10	16	13	17	20	20	20	21	21	31	107	157	10	208	42	10 7½	2 2 4	—	—	—	—	—	—	—	—	Oct., July, June																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
				449	5 2	5 8	23	23	21	14	—	15	24	15	22	22	23	22	18	151	55	224	36	21 8	2 2 5	—	—	—	—	—	—	—	—	—	Oct., Aug., Oct., Dec.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
†	88	Mrs. K. O'Driscoll, Lisboon, Tralee, Co. Kerry.	20/1/34 15/2/34 20/1/34 10/3/34 15/2/34	523	5 3	D	20	22	18	7½	—	—	—	—	—	—	19	40	8	67	58	10	44	2 0 3	(a) 869	lb. oz. dr.	(b) 120 2 3	(c) 206.5	(d) £4 11 7½	—	3	Oct., June, June																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
				524	5 8	6 12	—	10	22	13	14	13	17	18	11	7	5	58	61	3	122	12	10 10	2 1 3	—	—	—	—	—	—	—	—	—	—	—	June, June																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
				525	5 10	5 6	22	19	18	25	22	21	22	20	18	12	21	183	56	2	241	66	24 6½	2 1 5	—	—	—	—	—	—	—	—	—	—	—	June																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
				526	5 2	D	16	16	4	19	26	—	—	—	—	—	—	43	13	1	157	40	8 1	2 2 4	—	—	—	—	—	—	—	—	—	—	—	Aug., June																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
				527	5 6	D	16	16	4	19	26	—	—	—	—	—	—	43	13	1	157	40	8 1	2 2 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

D=Dead. † Disqualified under Clause 28 (pen produced less than 1,020 eggs.)

SECTION V.—ANY SITTING BREED OTHER THAN WHITE WYANDOTTE (STATION HOLDERS) 28 PENS.

Order of Merit	Number of Pen	NAME AND ADDRESS OF OWNER	Date of Hatching	Weight		EGGS LAID										EGGS PER FETTER		Averaging Weights per Fetter	Total Eggs from Pen				Date of Moulting (Week months in italics)
				On arrival of test	At close of test	Oct. 1-Nov. 3	Nov. 4-Dec. 1	Dec. 2-Jan. 20	Jan. 21-Feb. 20	Feb. 21-Mar. 20	Mar. 21-Apr. 20	Apr. 21-May 1	May 10-June 10	June 11-July 10	July 11-Aug. 10	Aug. 11-Sept. 1	First Grade	Second Grade	Total	First Grade	Second Grade	Total	
115	679	Rhode Island Red. Mrs. P. O'Reilly, St. John'sfort, Co. Louth.	3/23/34 25/2/34 " " 3/3/34 " "	5 0	5 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	131	108	239	131	108	239	June, June July, June Oct., June Aug., July Jan., Aug., June
				5 0	5 0	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	131	108	239	131	108	239	June, June July, June Oct., June Aug., July Jan., Aug., June
				5 0	5 0	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	131	108	239	131	108	239	June, June July, June Oct., June Aug., July Jan., Aug., June
				5 0	5 0	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	131	108	239	131	108	239	June, June July, June Oct., June Aug., July Jan., Aug., June
118	680	Buff Rock. Sister-Cath. Technical School, Strathgully, Loughis.	1934 January February January February	5 2	4 12	17 19	17 19	17 19	17 19	17 19	17 19	17 19	17 19	17 19	17 19	17 19	131	108	239	131	108	239	June, June July, June Oct., June Aug., July Jan., Aug., June
				5 0	4 12	17 19	17 19	17 19	17 19	17 19	17 19	17 19	17 19	17 19	17 19	17 19	131	108	239	131	108	239	June, June July, June Oct., June Aug., July Jan., Aug., June
				5 0	4 12	17 19	17 19	17 19	17 19	17 19	17 19	17 19	17 19	17 19	17 19	17 19	131	108	239	131	108	239	June, June July, June Oct., June Aug., July Jan., Aug., June
				5 0	4 12	17 19	17 19	17 19	17 19	17 19	17 19	17 19	17 19	17 19	17 19	17 19	131	108	239	131	108	239	June, June July, June Oct., June Aug., July Jan., Aug., June
1104	613	Rhode Island Red. Mrs. E. Loughrey, Drumanna, Cushnoc, Co. Clare.	25/3/34 " " " " " "	5 0	6 0	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	131	108	239	131	108	239	June, June July, June Oct., June Aug., July Jan., Aug., June
				5 0	6 0	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	131	108	239	131	108	239	June, June July, June Oct., June Aug., July Jan., Aug., June
				5 0	6 0	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	131	108	239	131	108	239	June, June July, June Oct., June Aug., July Jan., Aug., June
				5 0	6 0	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	131	108	239	131	108	239	June, June July, June Oct., June Aug., July Jan., Aug., June
1114	673	Rhode Island Red. Mrs. E. M. O'Reilly, Protestant, Allihew, Charleville, Co. Cork.	9/2/34 " " " " " "	5 8	6 2	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	131	108	239	131	108	239	June, June July, June Oct., June Aug., July Jan., Aug., June
				5 8	6 2	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	131	108	239	131	108	239	June, June July, June Oct., June Aug., July Jan., Aug., June
				5 8	6 2	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	131	108	239	131	108	239	June, June July, June Oct., June Aug., July Jan., Aug., June
				5 8	6 2	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	20 12	131	108	239	131	108	239	June, June July, June Oct., June Aug., July Jan., Aug., June
1103	607	Rhode Island Red. Mrs. E. Loughrey, Kilmore, Tullow, Co. Wicklow.	1934 March " " " "	5 6	5 1	17 22	17 22	17 22	17 22	17 22	17 22	17 22	17 22	17 22	17 22	17 22	131	108	239	131	108	239	June, June July, June Oct., June Aug., July Jan., Aug., June
				5 6	5 1	17 22	17 22	17 22	17 22	17 22	17 22	17 22	17 22	17 22	17 22	17 22	131	108	239	131	108	239	June, June July, June Oct., June Aug., July Jan., Aug., June
				5 6	5 1	17 22	17 22	17 22	17 22	17 22	17 22	17 22	17 22	17 22	17 22	17 22	131	108	239	131	108	239	June, June July, June Oct., June Aug., July Jan., Aug., June
				5 6	5 1	17 22	17 22	17 22	17 22	17 22	17 22	17 22	17 22	17 22	17 22	17 22	131	108	239	131	108	239	June, June July, June Oct., June Aug., July Jan., Aug., June

D: 1 dead. * Disqualified under Clause 28 (more than 20 per cent. second grade eggs).

SECTION V.—ANY SITTING BREED OTHER THAN WHITE WYANDOTTE (STATION HOLDERS) — continued.

Order or No. of Pen	NAME AND ADDRESS OF OWNER	Date of Hatching	No. of Pullet	WEIGHT		EGGS LAID										EGGS PER FUMLET				Average Weight of Eggs per Pullet	Total Eggs from Pen.	Total weight, per dozen.	Total value from Pen.	Eggs under 12 weeks.	Number of times Broody	Date of Mating (See notes in Rules)																																																																																																																																																																																		
				On Arrival	At close of Test	Jan. 2-1-Jan. 10	Jan. 10-1-Jan. 20	Jan. 20-1-Feb. 10	Feb. 10-1-Mar. 20	Mar. 20-1-Apr. 10	Apr. 10-1-May 20	May 20-1-June 10	June 10-1-July 10	July 10-1-Aug. 10	Aug. 10-1-Sept. 10	Special Grade	First Grade	Second Grade	Total																																																																																																																																																																																									
28	Rhode Island Red. Mrs. M. Cruise, Tulla, Three Castles, Co. Kilkenny.	1931 February	577 578 579 580 581 582	5 7 5 14 5 13 5 5 5 8 4 15	6 0 5 12 5 4 5 8 5 8 5 12	5 12 6 8 5 12 6 8 5 12 6 8	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8 5 12 6 8 5 12 6 8 5 12	6 8

D=Dead.

SECTION V.—ANY SITTING BREED OTHER THAN WHITE WYANDOTTE (STATION HOLDERS)—continued.

Order of Merit	NAME AND ADDRESS OF OWNER	Date of Hatching	WEIGHT		EGGS LAID												EGGS PER PULLET			Value per Pullet	Average Weight of Eggs	(a) Total Eggs from Pen.			Number of times Broody	Date of Moulting. (Neck moult in italics)					
			No. of Pullet	On arrival of test. lb., oz. lb., oz.	Oct. 7-Nov. 3	Nov. 4-Dec. 1	Dec. 2-Dec. 29	Dec. 30-Jan. 26	Jan. 27-Feb. 23	Feb. 24-Mar. 23	Mar. 24-Apr. 20	Apr. 21-May 18	May 19-June 15	June 16-July 13	July 14-Aug. 10	Aug. 11-Sept. 7	Special Grade	First Grade	Second Grade			Total	First Grade— Oct. 1-Jan. 6	(b) Total weight, from Pen.			(c) Total value from Pen.	(d) Total weight, from Pen.			
†	105	1884 <i>Buff Rock.</i> Mrs. K. McCabe, Deerpark, Aldnamullen, Castledisney, Co. Monaghan.	February	619	5 9 0 0	17	18	16	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	June		
			"	620	5 0 6 4	17	17	16	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	Aug.		
			"	621	5 0 6 4	17	17	16	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	July		
			"	622	5 0 5 8	17	17	16	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	Oct., June		
			"	623	5 0 6 6	17	17	16	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	June	
13	94	<i>Light Sussex.</i> Miss E. Walsli, Barnagh Lodge, Carnagh, Co. Waterford.	1/3/34	703	5 7 6 4	14	13	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	June		
			1/3/34	704	5 8 6 4	14	13	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	June		
			1/3/34	705	5 8 6 4	14	13	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	June		
			1/3/34	706	5 8 6 4	14	13	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	June		
			"	707	6 7 0 4	20	22	21	8	16	19	20	25	24	27	20	15	12	14	8	110	83	205	7	10	10	10	10	10	July	
†	97	<i>Rhode Island Red.</i> Mrs. M. Curran, Tullagh Park, New Ross, Co. Wexford.	1/3/34	571	5 2 5 12	18	11	8	19	17	16	14	13	12	12	11	11	7	08	50	155	53	13	11	11	11	11	11	Oct., July		
			"	572	4 2 5 10	18	11	8	19	17	16	14	13	12	12	11	11	7	08	50	155	53	13	11	11	11	11	11	Oct., Aug.		
			"	573	5 0 5 11	16	2	2	17	7	9	15	14	14	11	15	11	41	76	10	133	18	11	11	11	11	11	11	June		
			"	574	5 3 5 4	23	22	6	22	18	20	25	14	22	12	8	10	7	43	125	22	132	43	20	31	2	2	2	2	June	
			"	576	6 6 6 4	23	17	23	21	15	16	20	17	14	8	7	43	125	22	132	43	20	31	2	2	2	2	2	2	June	
†	117	<i>Buff Rock.</i> Mrs. N. K. Clugagh House, Oola, Co. Limerick.	"	576	4 14 1	21	20	21	9	—	—	—	—	—	—	—	2	50	10	71	52	10	51	1	15	1	1	1	June		
			February	691	5 0 5 2	15	13	10	18	17	10	21	10	6	—	—	—	3	85	59	147	33	14	13	2	2	2	2	2	Aug.	
			"	692	5 0 5 2	16	13	10	18	16	19	21	10	6	—	—	—	3	85	59	147	33	14	13	2	2	2	2	2	June	
			"	693	4 12 4 15	18	20	18	16	18	23	22	18	15	13	7	140	36	—	176	30	16	1	2	2	2	2	2	2	Nov., June	
			"	694	6 0 6 0	18	17	16	18	18	18	17	16	19	20	—	—	—	219	56	21	91	2	2	2	2	2	2	2	Dec., Aug.	
*†	116	<i>Barred Rock.</i> Miss H. Power, Slieverue, Butterstown, Co. Waterford.	"	695	5 3 5 8	17	6	2	18	19	17	23	24	26	24	—	18	8	116	27	26	4	13	2	2	2	2	2	June		
			"	696	5 2 5 2	16	11	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	June	
			10/2/34	685	5 12 8 0	9	16	20	23	10	13	16	8	5	4	—	—	—	114	29	6	149	10	04	2	2	2	2	2	2	June
			"	686	5 12 8 0	—	7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	Oct., Aug.	
			"	687	5 0 5 6	—	7	18	10	21	25	21	23	11	11	21	16	2	111	80	103	16	16	5	0	0	0	0	0	0	July

D=Dead. * Disqualified under Clause 28 (more than 20 per cent. second grade eggs). † Disqualified under Clause 28 (Pen produced less than 1,020 eggs).

SECTION V.—ANY SITTING BREED OTHER THAN WHITE WYANDOTTE (STATION HOLDERS) — continued.

Order of Merit	NAME AND ADDRESS OF OWNER	Date of Hatching	No. of Pullets	WEIGHT		EGGS LAIN														EGGS PER PULLET			Average Weight of Eggs			Total Eggs from Pen			Date of Maturity (See table)																																																																																																																																																																																																																																																																																																																																																																																																																					
				On arrival	At close of test	Oct. 7-Nov. 2	Nov. 4-Dec. 1	Dec. 2-Dec. 13	Dec. 30-Jan. 9	Jan. 27-Feb. 23	Feb. 24-Mar. 23	Mar. 24-Apr. 20	Apr. 21-May 18	May 19-June 15	June 16-July 18	July 19-Aug. 10	Aug. 11-Sept. 7	Special Grade	First Grade	Second Grade	Total	First Grade								Second Grade	Total	1st Grade	2nd Grade	Total	1st Grade	2nd Grade	Total																																																																																																																																																																																																																																																																																																																																																																																																													
113	Rhode Island Red. Miss M. O'Donovan, Dromore, Villiersstown, Cappagh, Co. Waterford.	1931 February	667	5 12	5 13	10	9	18	8	18	22	24	24	23	23	19	18	18	46	2	216	41	20	14	4	Aug. June	(a) 970 (b) 138 3 15 (c) 274 (d) 71 10 11																																																																																																																																																																																																																																																																																																																																																																																																																							
			668	5 15	6 12	—	23	24	17	18	19	19	19	22	18	5	207	1	248	52	20	14	4	June, June	(a) 913 (b) 126 4 13 (c) 257 (d) 74 7 81																																																																																																																																																																																																																																																																																																																																																																																																																									
			670	6 6	6 6	22	18	17	17	17	17	17	16	16	21	18	3	258	19	3	9	2	Aug., May	(a) 951 (b) 126 4 13 (c) 257 (d) 74 7 81																																																																																																																																																																																																																																																																																																																																																																																																																										
			671	6 6	6 6	22	18	17	17	17	17	17	16	16	21	18	3	258	19	3	9	2	Aug., May			(a) 951 (b) 126 4 13 (c) 257 (d) 74 7 81																																																																																																																																																																																																																																																																																																																																																																																																																								
			672	5 10	5 10	4	5	16	21	21	21	21	21	22	22	19	75	79	102	1	22	6	11					Aug., May	(a) 951 (b) 126 4 13 (c) 257 (d) 74 7 81																																																																																																																																																																																																																																																																																																																																																																																																																					
91	Barred Rock Sister M. Alphonsus, R.D.E. School, Swinford, Co. Mayo.	20/2/34	535	5 2	5 8	6	6	13	14	4	13	18	19	13	10	8	11	8	60	61	132	18	10				9	1		Nov., Feb.	(a) 913 (b) 126 4 13 (c) 257 (d) 74 7 81																																																																																																																																																																																																																																																																																																																																																																																																																			
			536	5 2	5 4	10	8	17	12	5	20	19	17	17	16	12	15	40	116	12	168	39	15		7		1	Jan.		(a) 913 (b) 126 4 13 (c) 257 (d) 74 7 81																																																																																																																																																																																																																																																																																																																																																																																																																				
			537	5 5	5 5	—	20	19	14	4	19	23	25	21	21	17	26	134	74	4	212	61	21	2	1		Oct., June	(a) 913 (b) 126 4 13 (c) 257 (d) 74 7 81																																																																																																																																																																																																																																																																																																																																																																																																																						
			538	6 8	6 10	11	3	17	18	17	19	20	21	16	18	19	16	53	125	4	182	25	16	0	1	Nov., Feb.	(a) 913 (b) 126 4 13 (c) 257 (d) 74 7 81																																																																																																																																																																																																																																																																																																																																																																																																																							
			540	5 12	5 8	14	3	16	13	—	6	23	23	24	23	21	20	112	35	3	190	26	6	10	1	Nov., Feb.			(a) 913 (b) 126 4 13 (c) 257 (d) 74 7 81																																																																																																																																																																																																																																																																																																																																																																																																																					
95	Rhode Island Red. Mrs. C. Clarke, Nullastown, Cree, Co. Louth.	7/3/34	539	4 10	4 10	19	14	10	14	10	17	20	21	—	—	—	—	43	96	38	43	43	6	9	4	Dec., June					(a) 889 (b) 118 5 4 (c) 256 (d) 74 7 74																																																																																																																																																																																																																																																																																																																																																																																																																			
			540	4 8	4 6	15	10	9	9	9	17	20	21	11	21	14	—	62	92	6	100	61	12	9	2	Dec., June				(a) 889 (b) 118 5 4 (c) 256 (d) 74 7 74																																																																																																																																																																																																																																																																																																																																																																																																																				
			541	4 10	5 6	21	22	23	20	20	20	22	22	14	23	9	22	103	87	193	7	16	0	1	15	Dec., Aug., June		(a) 889 (b) 118 5 4 (c) 256 (d) 74 7 74																																																																																																																																																																																																																																																																																																																																																																																																																						
			542	4 10	5 6	21	22	23	20	20	20	22	22	14	23	9	22	103	87	193	7	16	0	1	15	Dec., Aug., June	(a) 889 (b) 118 5 4 (c) 256 (d) 74 7 74																																																																																																																																																																																																																																																																																																																																																																																																																							
			543	4 14	5 8	20	17	—	—	—	20	21	24	22	14	23	9	22	103	87	193	7	16	0	1	15			Dec., Aug., June			(a) 889 (b) 118 5 4 (c) 256 (d) 74 7 74																																																																																																																																																																																																																																																																																																																																																																																																																		
111	Rhode Island Red. Mrs. M. R. Morrissey, Ballycoe House, Dungarven, Co. Waterford.	1934 March	655	5 10	6 10	15	10	7	2	18	21	18	10	11	11	11	6	109	38	2	149	30	14	10	1	Dec., July			(a) 874 (b) 123 11 3 (c) 272 (d) 74 6 7																																																																																																																																																																																																																																																																																																																																																																																																																					
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NOTES AND MEMORANDA.

Third International Congress of Soil Science, 1935.

The Third International Congress of Soil Science was held at Oxford during the period from the 30th July to the 7th August, 1935, and was attended by approximately 400 members, including official delegates from about 40 countries. Mr. T. O'Connell, F.R.C.Sc.I., the Department's Chief Inspector, was present as delegate from the Irish Free State.

The Congress was opened by the Vice-Chancellor of Oxford University, and his address was followed by a Presidential address from Sir E. J. Russell, D.Sc., F.R.S., Director of the Rothamsted Experiment Station. The proceedings of the Congress were divided between six Commissions dealing with soil physics, soil chemistry, soil microbiology, soil fertility, soil genesis, morphology and cartography, and land amelioration respectively. Two Sub-Commissions dealt with alkali soils and forest soils respectively. A large number of papers was presented at each of the Commissions, and these have been reprinted in two volumes which have been published by the Congress Authorities.

Members of the Congress were entertained to a banquet given by the British Government in Christ Church Hall. During the Congress, visits were paid to several places of interest, including the farm attached to St. John's College, Oxford, the Rothamsted Experiment Station, and the Agricultural Research Station of Imperial Chemical Industries at Jealott's Hill.

Subsequent to the Congress a number of the delegates participated in a tour of Great Britain during which visits were paid to various places of scientific interest.

Annual Congress of the National Veterinary Medical Association of Great Britain and Ireland, 1935.

The Department was represented by its Chief Veterinary Officer, Mr. J. H. Norris, M.R.C.V.S., at the Annual Congress of the National Veterinary Medical Association of Great Britain and Ireland, held in the Queen's University, Belfast, under the Presidency of Professor J. F. Craig, M.A., M.R.C.V.S., from the 29th July to the 2nd August, 1935. The Congress was given a civic and academic welcome by the Lord Mayor of Belfast and the Vice-Chancellor of the University. The work of the Congress was divided into three main Sections, namely :—

- (1) Veterinary Medicine and Surgery, under Mr. J. Ewing Johnston, Belfast.
- (2) Experimental Pathology, under Professor J. B. Buxton, Cambridge.
- (3) Public Health, under Mr. F. J. Daly, M.R.C.V.S., Swords, Co. Dublin.

In the Medical and Surgery Section. Mr. Harvey, a well-known practitioner in Cornwall, opened the discussion on some aspects of Red-water in cattle, in the course of which, the importance of immunity and careful nursing and management during the illness were emphasised. With regard to treatment, the merits of "Acaprin" were favourably mentioned by those who had experience of this comparatively new drug. Mr. H. G. Lamont, Belfast, provided a paper on Coccidiosis in bovines and poultry. The symptoms of the bovine and avian disease, the usual methods of infection, and the question of immunity, disinfection, control and treatment were fully discussed. Mr. P. F. Dolan, Dublin, spoke on the position of the Veterinary Surgeon in the control of milk, with special reference to communicable diseases, emphasising the importance of self-contained herds, and the maintenance of tubercle-free and abortion-free herds, and referring to the position with regard to Mastitis. The production of high grade milk, bacterial counts, veterinary inspection of dairy herds, microscopic examination and biological tests for detection of tubercle bacilli in milk, and pasteurisation, were also dealt with. Major Townsend, R.A.V.C., read a paper on "The Modern School of Thought on the Practical Effect of Certain Unsoundnesses on the Serviceability of Riding Horses." The significance of such important equine diseases as roaring, navicular disease, sprained tendons, etc. was fully discussed, and comparisons were drawn between disease effects among civilian and army horses. The discussion, which was well sustained, was opened by Mr. P. J. Howard of Ennis. Colonel W. A. Wood, Cambridge, gave a paper on the common helminth parasites of ruminants. Recent research work in this sphere was reviewed, including the treatment and prevention of liver fluke infestations.

Colonel Dunlop Young, London, presented a paper on the work of Veterinary Officers, with special reference to the production and inspection of imported meat. The preservation and transit of meat were also discussed.

Interesting operations and demonstrations were performed by Dr. Frost, New York State Veterinary College, Cornell University, Professor Mitchell, Royal (Dick) Veterinary College, Edinburgh, Professor Browne, Veterinary College, Dublin, and Professor Wright and Miss Lock, Royal Veterinary College, London.

Third Imperial Botanical Conference, 1935.

The Third Imperial Botanical Conference was held in London from the 28th to the 30th August, 1935. The meetings took place in the rooms of the Linnaean Society, by permission of the Council. The object of these Conferences is to bring together the botanists of the Commonwealth with a view to the discussion of questions of botanical or biological interest in the various countries. Mr. J. W. Besant, A.H.R.H.S., Keeper of the Botanic Gardens, Glasnevin, Dublin, was in attendance as representative of the Department.

The subjects dealt with during the Conference included—Pasture Research in different parts of the Commonwealth; Fruit Storage and Transport;

Gas Storage of Fruit ; Resistance of the Apple to Fungal Attack ; Collection and Classification of Crop Varieties, and the application of Ecological Methods to the Study of Tropical Agriculture. Many of the papers submitted were very directly concerned with the application of Science to the problems of agriculture, horticulture and forestry. The furtherance of a scheme for the creation of Liaison Officers between the different countries concerned, the object of which is to arrange for the exchange of botanists, was also considered.

The Conference terminated with a visit to the Royal Botanic Gardens, Kew, where Members were free to visit also, the Herbarium, the Library, or the Museums.

Sixth International Botanical Congress, 1935.

The Sixth International Botanical Congress was held at Amsterdam from the 2nd to the 7th September, 1935, inclusive, and the Department was represented by Mr. J. W. Besant. These Congresses are held at intervals of five years in different countries.

The Congress was divided into ten Sections, and the numerous and comprehensive papers which were submitted, covered the whole field of pure and applied botany. Excursions were arranged to places of botanical and horticultural interest, including Aalsmeer, a very large flower-growing centre; Lisse, the well-known bulb-cultivation centre; the Botanical Laboratory and National Herbarium, and the large vineries at Leyden, the well-equipped Laboratory for Technical Botany at Delft, and the reclaimed Zuider Zee—on portions of which farms are already established.

Sixth International Congress of Entomology, 1935.

The Sixth International Congress of Entomology was held in Madrid from September 6th to September 12th (inclusive), under the presidency of Professor C. Bolivar of the Natural History Museum, Madrid.

There was a total attendance of about 250 at the Congress, approximately 150 being official delegates, representing thirty different countries.

Mr. J. Carroll of the Agricultural Zoology Department attended as representative of University College, Dublin.

The Congress was officially opened by the President of the Spanish Republic.

The Congress proceedings were divided into a number of sections, as follows :—

- (1) General Entomology.
- (2) Morphology, Physiology and Insect Development.
- (3) Nomenclature.
- (4) Ecology.

- (5) Agricultural and Horticultural Entomology.
- (6) Forest Entomology.
- (7) Medical and Veterinary Entomology.
- (8) Bee-Keeping.

A number of papers was delivered at each of the sections, and generally these papers gave rise to discussions.

While the official language of the Congress was Spanish, many papers were delivered in English by English-speaking delegates from various parts of the world.

In connection with the Congress proceedings, visits were arranged to the Natural History Museums in Madrid, and to the State Forest Entomology Station.

Delegates to the Congress were entertained to a reception in the National Palace by the President of the Republic, and also to a reception in the City Council Chamber by the Mayor and City Council of Madrid.

Fourth Imperial Entomological Conference, 1935.

The Fourth Imperial Entomological Conference was held in London from September 19th to September 27th, 1935, and was presided over by Sir Charles J. Howell Thomas, Chairman of the Executive Council of the Imperial Agricultural Bureaux. All the Dominions (except New Zealand and Newfoundland), Great Britain, Northern Ireland, India, Ceylon and the Crown Colonies were represented at the Conference by official delegates. The total number of such delegates who attended was twenty-seven.

Saorstát Eireann was represented by Mr. J. Carroll of the Agricultural Zoology Department, University College, Dublin.

The Conference reviewed the activities and accomplishments of the Imperial Institute of Entomology during the five years 1930-1935, and discussed the extent to which these activities could be maintained or extended during the coming five years.

A business committee, which included the representative of Saorstát Eireann, examined in detail the working and finances of the Imperial Institute of Entomology and drew up a report, which was adopted by the Conference, making recommendations concerning the future working and finances of the Institute.

A number of subjects pertaining to the Science of Entomology was discussed at meetings of the Conference which were open to the public. The chief discussions were on the following subjects :—

- (1) Locusts and Grasshoppers.
- (2) Termites.
- (3) Cotton-stainers and their control.
- (4) Sheep Blowflies.
- (5) The Biological Control of Insect Pests.
- (6) Pests of Stored Products.

(7) The Need for Forest Entomologists, with special reference to the Pin-hole Borer Problem.

(8) Plant Viruses and their Insect Vectors.

Excursions to Rothamsted Experiment Station, the Forest Products Research Laboratory at Princes Risborough, the Stored Products Research Laboratory at Slough, and the Parasite Laboratory of the Imperial Institute of Entomology at Farnham Royal were organised.

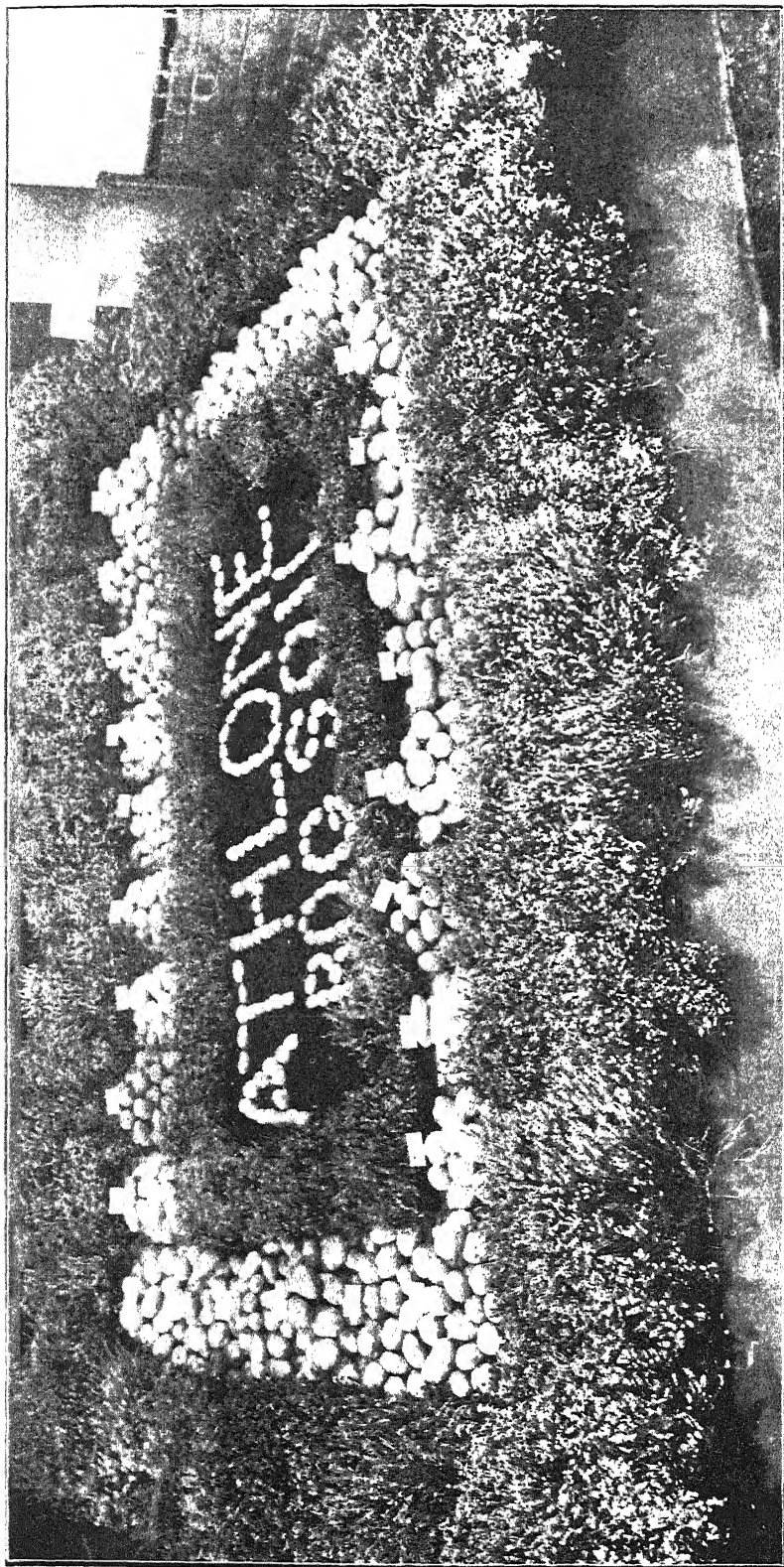
A reception to the delegates given by the Trustees of the British Museum was held in the Natural History Museum, South Kensington, and a dinner was given by the British Government at Lancaster House.

Seed Potato Exhibit at the Royal Horticultural Society's Show, National Hall, Olympia, London, 25th-27th September, 1935.

An exhibit of potatoes was staged by the Irish Free State Department of Agriculture at the Royal Horticultural Society's Show with a view to bringing to the notice of seed merchants, gardeners, allotment holders and others, the quality for seed purposes of potatoes grown on reclaimed bog land in the area around Athlone and other centres in the Midland and Western counties of Ireland.

Buyers in Malta, Cyprus and in the home markets prefer bog seed to that grown on any other type of soil. A few of the best buyers in England also prefer bog seed, and the demand for it is steadily on the increase.

The photograph shows the lay-out of the stand, which was greatly admired. The border of heather—the natural product of the bog—was very striking and beautiful, being in good bloom. The bog soil in the centre portion of the Stand was closely examined by many who had not hitherto seen this type of soil. The exhibit was awarded the Society's Knightian Medal and was, from every point of view, a great success.



Seed Potato Exhibit staged by the Department of Agriculture at the Royal Horticultural Society's Great Autumn Show, National Hall, Olympia, London, on the 25th-27th September, 1935.

Meeting of the International Commission of Agriculture, 1935.

The International Commission of Agriculture held its general meeting in Brussels in July, 1935. Those present included 110 delegates representing some 50 agricultural organisations in 17 countries.

Detailed reports were presented on the following three subjects :

- (1) Organisation of Agricultural Production under planned economy ;
- (2) The edible fats problem.
- (3) Limitation of pig breeding and fattening (especially attempts made in Denmark and Holland).

The proposal for the formation of a Permanent Agricultural Commission in the International Labour Office, Geneva, was welcomed. The Commission considered that the two principal problems, the solution of which would bring the agricultural crisis to an end, are those of (a) wheat, and (b) edible fats.

Second International Congress of Rural Engineering, 1935.

The Second International Congress of Rural Engineering was held in Madrid from the 26th September to the 3rd October, 1935. More than 350 delegates, representing 22 countries, were present. 52 papers, which were grouped under the following four headings, were presented :—

- (1) Soil science, hydraulics and management of rural areas ;
- (2) Rural buildings.
- (3) Agricultural mechanics and electric agricultural appliances.
- (4) Scientific organisation of agricultural work.

These papers were read and discussed by the different groups, and have since been published in one volume.

An exhibition of photographs and drawings of different kinds of apparatus used in connection with agricultural engineering proved of great interest to the delegates, and excursions were arranged to various places in the neighbourhood of Madrid, which were interesting both from an engineering and a tourist point of view.

The holding of this Congress in Spain proved a great success. It was proposed and agreed, that at future congresses, the questions of irrigation, colonisation in connection with hydraulic schemes, and the use of electricity in rural areas should be seriously considered.

Potato Production in the Northern Hemisphere.

The International Institute of Agriculture, in the December issue of its *Crop Report and Agricultural Statistics*, summarises as follows the results of the potato crops in the northern hemisphere, excluding the U.S.S.R.

The area devoted to potatoes in the northern hemisphere this year was almost equal to that of last year, and to the average acreage of the five preceding years. The weather conditions of the year, however, were

unfavourable in most of the potato growing countries, and the result is seen in the yields secured this year. These are lower than those of last year, and also below the average. The total production of the northern hemisphere, excluding Russia, is provisionally estimated by the Institute at 143 million metric tons, as against 160 million metric tons in 1934, and an average of 150 million metric tons in the five years 1929 to 1933.

It is believed that this substantial decrease of 17 million metric tons from the plentiful out-turn of last year, and of 7 millions from the average, will result in a greater demand for cereals, particularly fodder cereals.

International Standardizing of Herdbooks and Milk Recording.

Efforts have been made recently to reach more uniformity in methods of herdbook keeping and milk recording in the different countries. As a matter of fact these methods, as is clearly shown in a monograph published by the International Institute of Agriculture at Rome, differ greatly from one country to another and do not permit of any comparison of data furnished by herdbook organisations and milk-recording societies. The Institute regards this as a considerable handicap to the international trade in pedigree animals and in international studies of genetics and dairy records, which are based on those data. Proposals to unify methods of milk recording, which were made at the World's Dairy Congress in Copenhagen, 1931, distinguish three Classes of milk-recording methods according to the degree of accuracy. The question of making herdbook methods more uniform has been discussed at the Agricultural Congresses in Prague and Budapest, and recently in a Conference of Experts held at the International Institute of Agriculture in February 1935. The Conference has established some general principles of herdbook keeping as a basis for future uniformity. At present these proposals are being studied by the Governments of the different countries and will then be presented to a Diplomatic Conference for definitive adoption.

Export Premiums in Finland.

The Finnish Budget for the year 1935 contains an item of 95 million Finnish marks, or approximately £419,240, which has been earmarked for providing bounties for stabilizing the prices of agricultural produce. Bounties are being paid this year as follows for exported agricultural produce :—

Finnish Marks per Kg. (2.2 lb.)					
Butter	..	..	..	6.50	„
Cheese, and processed cheese in boxes	..	..	..	2.50	„
Eggs (hens')	..	..	..	3.00	„
Pork	..	..	..	3.25	„
Beef	..	..	..	1.00	„
Reindeer meat salted or smoked	..	..	..	2.50	„
Reindeer meat, fresh	..	..	..	1.50	„
Live pigs	..	..	..	2.50	„ 1.w.

No bounty, however, is paid on eggs exported to Germany, on cheese exported to U.S.A., or on fresh or salt pork exported to England.

Note.—At present rate of exchange, the Finnish mark is worth slightly more than 1d.

State-Aid for the German Poultry Industry.

The German Minister for Agriculture has introduced a bill for promoting the poultry industry. Under this measure, the sum of 450,000 Rm. (nearly £37,000 at present rate of exchange) will be made available in the shape of grants in aid of the purchaser of day-old chicks and pullets from recognised flocks. As 80 per cent. of German eggs are produced on farms, the grants would be made to farmers who practise poultry rearing as a side-line, and who are prepared to rear the birds in a proper and scientific manner. When the average purchase price of chicks is 60 Pf. apiece and of pullets 2.80 Rm., maximum grants of 20 and 60 Pf. respectively, will be given. The grants were only to be given in the case of birds purchased previous to 15th May, 1935.

Danish Beef Scheme.

The Danish scheme for distributing beef to necessitous persons was initiated in December, 1934, and was to remain in force until October, 1935. For the purposes of the scheme, a sum of about £156,250 was set aside by the Government.

The bulk of this sum was to be distributed among the various communes, or parishes, into which the country is divided, each parish receiving a sum proportionate to its total outlay during the six months from 1st October, 1933 to 31st March, 1934 upon parish relief, poor relief, and old age and sickness benefit. The balance of the fund was placed at the disposal of the Minister for Social Affairs for helping parishes in which, for any reason, the distribution above described could not be made.

Should any sum remain after the distributions have been made, it would be divided among the parishes which have organised the distribution of meat, in proportion to that part of their expenditure not covered by the fund.

The beef to be distributed must be approved by a veterinary surgeon. The parish authorities themselves decide whether they will buy cattle or beef and distribute the meat themselves, or will leave to the party concerned, the task of purchasing the ration of meat allotted to him. In the latter case, the beef may only be bought in butchers' shops or, where such do not exist, from meat-dealers approved by the parish authorities.

The Beef Distribution Law was subsequently extended to the end of November, 1935.

Prevalence of Warble Fly in Denmark.

For a number of years past, records have been kept and statistics compiled showing the prevalence of the warble fly in Denmark. In 1923-24, the pest was found in every county (Amt), but in varying numbers and extent. Farms on the mainland, in Jutland, were most heavily attacked, whilst the islands suffered to a much smaller extent. The percentage of herds affected varied from 5 per cent. on the Lolland-Falster islands to 81.5 per cent. of herds at Tonder, on the mainland.

In 1927-30, the corresponding figures for the islands were below 1 per cent. The decrease in the pest on the Danish islands since the year 1923-24, was so great that in most places it amounted to complete eradication. On the other hand, the farms on the mainland showed a very small decrease in most cases, and in some instances an increase was recorded.

The following table shows the percentage of herds affected in six of the most infected districts between 1923 and 1933 :—

			1923-24	1927-30	1931-33
			%	%	%
Tonder	..	..	81.5	69.0	74.1
Aabenraa	..	..	73.2	70.9	40.9
Haderslev	..	..	71.2	60.2	62.0
Ribe	..	..	55.4	67.9	63.7
Ringkøbing	..	..	44.2	46.1	47.3
Thisted	..	..	43.2	43.5	41.1

Butter Production in Denmark, 1933.

The last annual report on compulsory butter-tests in Denmark contains some information as to the total butter output of that country in the year 1933. The calculation is based on the particulars as to daily milk yield and butter yield which are furnished to the Experiment Laboratory by practically all Danish creameries.

The number of creameries which participated in the tests in 1933 was 1623 (1622 in the previous year), and the total quantity of milk handled was 4840 million kilos and of butter produced 185 million kilos. The amount of butter exported from Denmark in 1933 was 151 million kilos, while the amount consumed at home was 34 million kilos, or 18 per cent. of the total production.

The following table shows Denmark's production of milk and butter during the past 11 years :—

		Total milk	Total butter	Home Consumption of Butter.	
		Mill. Kg.	Mill. Kg.	Mill. Kg.	% of total production
1923	..	3539	132	20	15
1924	..	3717	140	17	12
1925	..	3766	141	18	13
1926	..	3989	152	19	13
1927	..	4213	162	19	12
1928	..	4287	166	18	11
1929	..	4601	179	20	11
1930	..	4843	190	21	11
1931	..	4962	195	23	12
1932	..	4826	188	30	16
1933	..	4840	185	34	18

Netherlands Production of Potato By-Products, 1933-34.

Preliminary figures which have recently been published relative to the Netherlands potato by-products industry for the 1933-34 period, indicate a decline of production in comparison with the preceding season. The total number of manufacturers engaged in the potato products industry remains unchanged at thirty-four. As raw material, an aggregate of 636,020 metric tons of potatoes was used. Comparative quantities for the preceding three seasons were respectively 820,260, 365,540, and 739,000 tons. The total production of potato flour in 1933-34 was 132,888 metric tons against 151,410 tons in 1932-33, and a yearly average output of 172,186 tons between 1925 and 1930. The production of dextrine amounted to 25,774 tons compared with 28,812 tons in the preceding period, and an average of 20,580 tons in the years 1925 to 1930. The total production of potato glucose weighed 36,456 tons.

The production of potatoes is a minor though important branch of Dutch agriculture, which, during the crisis years, has been suffering from low prices and over-production. In order to assist the by-products industry, the Government guarantees a maximum price for potato flour, and in order to strengthen prices, the State has from time to time purchased substantial quantities of potato flour and taken it off the market.

Machine-Milking v. Hand-Milking.

Experiments have been carried out by the Danish Agricultural Experiment Laboratory, from 1931 to 1934, for the purpose of comparing the relative merits of hand-milking as compared with machine-milking. Six trials

were made with 214 milch cows, and the Laboratory studied at the same time the bacterial content and keeping quality of the milk from two of the trials. The whole experiment lasted 168 days.

As regards milk-yield, the hand-milked group was slightly ahead at the beginning of the test, and the difference increased as the trial advanced. During the whole trial (which lasted 168 days) the average milk yield of the hand-milked cows was 2366 kilos, whilst that of the machine-milked cows was only 2185 kilos. The difference was thus 181 kilos per cow, or about 1 kilo (2.2 lb.) more per cow per day in favour of hand-milking.

The hand-milking in the trial was done by milkers who were better than the average on Danish farms, but the same could probably be said with equal truth about the operators of the milking machines.

The Report concludes as follows:—"The virtue of machine milking is that it makes the work more agreeable. Particularly in the larger herds, it is an insurance against labour trouble and sickness amongst the milkers. But good hand-milking is the ideal form of milking and it is, under Danish conditions, at least in small herds, the cheapest. Whenever good hand-milking can be obtained, the installation of milking machines in such herds cannot be recommended. Under conditions where good hand-milking is difficult to obtain, use of the milking machines may be a solution of the problem.

The Use of Skim-Milk as Food.

In a recent article, a member of the Dominion Laboratory, New Zealand, has discussed the possibility of utilizing skim-milk for human food. He says that the attitude of the New Zealand people to the use of milk is somewhat anomalous. The consumption of milk in that country is very low, but that of butter is no less than 39 lb. per head per annum, or 40 grammes of butter-fat per day. This is the equivalent of about $1\frac{3}{4}$ pints of milk. If the consumer used the skim-milk as well as the fat, he would consume about the equivalent of $1\frac{3}{4}$ pints of whole milk, in other words, about the optimum quantity.

The average diet in New Zealand is said to be deficient in mineral matter, but if the whole of the milk—and not the fat only—were used, this lack would be largely made up.

The most convenient form in which skim-milk can be kept and used is in that of powder. This powder might, it is suggested, be used in bread-making, in the proportion of about 5 parts of skim-milk powder to 95 parts of flour. One of the effects of this addition is that the mineral matter in the bread, apart from added salt, is almost doubled, and the proportion of lime is greatly increased. Moreover, the loaf rises better, and has a better appearance and flavour, and does not grow stale so quickly.

It is possible that skim-milk powder could be utilized in soups and other foods but, in the words of the New Zealand writer, "much educational work is required before skim-milk in any form will be accepted as an ordinary and substantial part of our diet."

Growing Flax and Hemp in Germany.

The measures adopted to increase flax and hemp growing in Germany have proved highly successful. The area under hemp increased from 750 acres in 1934 to 6500 acres in the following year, whilst the area under flax is nearly three times what it was in 1934. Efforts are to be made to increase still further the production of hemp and flax in 1936, and the Government are continuing their assistance as before.

Sixth World's Poultry Congress.

The Sixth World's Poultry Congress will be held at Leipzig from 24th July to 2nd August, 1936. A large concourse of people is expected, and cheap railway facilities will be offered. The Congress languages will be English, German, French, Italian and Spanish. Lectures will be given on subjects connected with poultry and rabbit breeding, and there will be an exhibition of live animals and an industrial exhibition, representative of the participating countries.

Danish Pig-Killings, 1931-35.

According to an official return, the numbers of pigs killed at the Danish abattoirs during the years 1931 to 1935 were as follows:—

1931	..	7,320,349	pigs
1932	..	7,840,999	..
1933	..	6,392,011	..
1934	..	4,897,672	..
1935 (6 months)		2,172,863	..

British Sugar Beet Industry—Ten Years' Work.

The Agricultural Economics Research Institute of the University of Oxford have published a detailed report on the British sugar beet industry and its progress in ten years, under the subsidy.

The British Sugar (Subsidy) Act of 1925 was responsible for the development of sugar-beet growing in England and Wales. Under the stimulus of this subsidy, it has become an important part of agriculture. For various

economic reasons, the industry has been mainly confined to the eastern counties of England, where beet-growing has been concentrated on farms near the factories.

Although the acreage under beet has increased greatly since 1924, the expansion has been erratic. When seasons were poor, or when prices fell off by reason of a drop in the rate of subsidy, the area declined. The acreage, however, has always recovered from these temporary lapses.

As a relief policy to arable farming, the sugar beet industry failed to achieve success in many arable districts, partly because there were no factories in the areas concerned. The increase in beet-growing has led to considerable changes in cropping. Beet has taken its place in the rotations, at the expense mainly of turnips and swedes, other roots and grain, but the acreage of potatoes does not appear to have been affected. The extension of grass land, and the by-products from the beet have ensured the necessary supplies of fodder for live stock, the numbers of which appear to have been maintained or even slightly increased in the sugar beet areas.

Despite the large labour requirements of sugar beet, agricultural employment has mostly declined in sugar beet areas, though not so much as in areas where no beet was grown.

The costs involved in growing the crop have shown a steady downward tendency. Many reasons have contributed to this, for example, increased knowledge of growers and skill of workers; more use of piece-work system; reduced rates of pay, with bonuses for good work; increased use of mechanical aids; improved methods of culture and handling of roots; use of the disk hoe which saves much subsequent cleaning and, finally, the concentration of beet on soils most suited to its cultivation.

The reductions in cost are thus due to a general improvement in almost every item rather than to a spectacular advance in any single detail.

The average yield has shown little change since 1924. This is attributed in part to the constant introduction of new growers. On the other hand, the amount of land in Great Britain capable of giving high yields is very limited. Some improvement in the average yield is thought to be likely, but the process will be slow.

As regards further State aid, the evidence collected by the Oxford Institute shows that the maintenance of the sugar beet industry undoubtedly involves assistance to the growers. The Institute lays down certain principles which, in the interests of public economy, should underlie any such assistance. Firstly, it should be based on a price at which suitable growers alone will be able to produce; secondly, the quantity of the produce which it is proposed to subsidise should be determined; thirdly, the subsidy should be related to the price of sugar; and finally, it should be reviewed at short intervals.

Scheme for Eliminating Tuberculous Cattle in France.

Under section 11 of the French meat market law, passed on 16th April, 1935, certain funds may, under exceptional circumstances, be utilised by the Minister for Agriculture for the purpose of slaughtering cattle, the elimination of which may be deemed necessary owing to their state of health due to tuberculosis.

The law further provides for the payment to breeders of grants towards the cost of disinfecting and improving their stables, which work must be done under the direction and supervision of the sanitary authorities.

The meat of diseased animals slaughtered under this section must be destroyed.

The object of the measure is twofold:—first, to eliminate undesirable animals and, second, to relieve the overloaded meat market.

The Minister decided that the quickest way to attain the end desired was by direct purchase on public markets, and owners were to be encouraged to offer their unthrifty beasts for sale to the committees appointed for the purpose. The work of buying cattle would be entrusted to the State veterinary service, in consultation with a local cattle-breeder. The animals purchased are to be slaughtered and the meat denatured and destroyed, under the supervision of the veterinary inspector. Should the scheme, as now planned, not produce the desired results, further plans will be considered.

Cow-Testing in Denmark, 1933-34.

The latest report issued by the National Committee of Cow-testing Societies gives the following average results for the whole country:

<i>Average per Cow.</i>			
Milk Yield	..	..	773 gals.
Milk-fat	..	..	3.85 per cent.
Butter	..	..	332.6 lb.
Butter-fat	..	..	297.8 lb.
Food units consumed	..	..	2925

The figures show that there has been a small increase in milk yield, and also in food consumed. The number of recorded cows shows a slight decrease.

but this is not surprising, in view of the difficulties of cattle-rearing in the past year. The following table indicates the progress of the movement in Denmark since 1928-29.

		Total No. of cows 1000's	No. of cows tested	Percentage of cows tested
1933-34	.. ..	1716	678,402	39.4
1932-33	.. ..	1770	701,087	39.6
1931-32	.. ..	1739	722,897	41.6
1928-29	.. ..	1579	542,149	34.3
1918-14	.. ..	1310	268,013	15.9

The herd which showed the highest results was composed of 7 cows which gave an average milk-yield of 1634.1 galls. with 4.32 per cent. butter-fat, and a yield of 756.8 lb. butter. This herd, as also the one which took second place, was of the Red Danish breed. The highest individual yield was that of a red cow which gave 2209.4 gallons of milk with 4.35 per cent. fat, 1078 lb. butter, and 959.2 lb. butter-fat.

OFFICIAL DOCUMENT.

Forty-fifth list.

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An Investigation into the Intensive System of Grassland Management—Report of the Seed Propagation Division, 1936—The Herring Fisheries off the North Coast of Donegal—The Irish Horse—The History of the Potato and its Progress in Ireland—The Saorstát Butter Testing Station—Final Fruit Crop Report, 1936—Report on the National Egg-Laying Competition, 1935/36—Notes and Memoranda.

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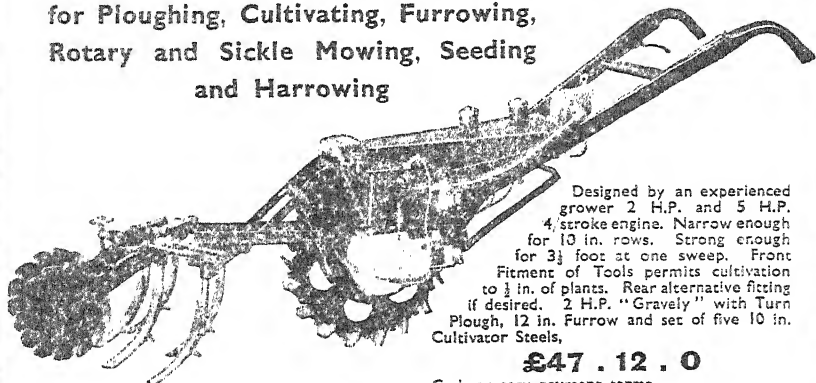
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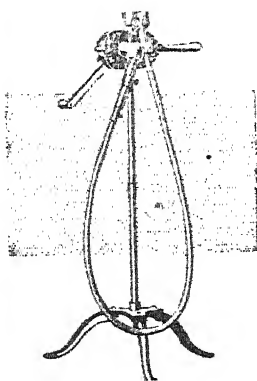


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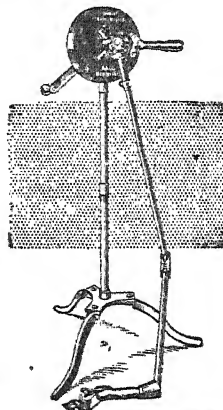


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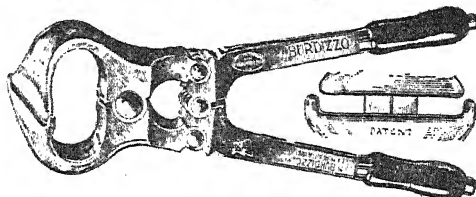
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CONTENTS

PAGE

An Investigation into the Intensive System of Grassland Management. By Professor J. P. Drew, M.Sc., A.R.C.Sc.I., and D. Deasy, B.Agr.Sc., Albert Agricultural College, Glasnevin, Dublin	225
Report of the Seed Propagation Division, 1936	248
The Herring Fisheries off the North Coast of Donegal. By G. P. Farran, B.A.	262
The Irish Horse	271
The History of the Potato and its Progress in Ireland. By W. D. Davidson, B.A., B.Sc.	286
The Saorstát Butter Testing Station	308
Final Fruit Crop Report, 1936	312
Report on the National Egg-Laying Competition, 1935/36	327
Notes and Memoranda	398

Sixth World's Poultry Congress, 1936—Annual Congress of the National Veterinary Medical Association, 1936—Commonwealth Scientific Conference, 1936—Sugar Beets as Feed for Live Stock—The Warble Campaign in Germany—The Danish Dairying Industry—Milk Recording in Sweden, 1934/35—Fishy Flavour in Butter: Swedish Experiments—Control of Bovine Tuberculosis in Denmark—Land Reclamation in Denmark—Danish Poultry Research—Official Stud-Book for Danish Cocks—The Evils of Egg-Washing: Circular to Danish Producers—Fourth International Grassland Congress, 1937

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AN INVESTIGATION INTO THE INTENSIVE SYSTEM OF GRASSLAND MANAGEMENT

By PROFESSOR J. P. DREW, M.Sc., A.R.C.Sc.I., and D. DEASY, B.AGR.Sc.,
University College, Dublin.

The more economic management of pasture land has recently become a problem of very great importance, and new methods of treatment have been advocated in order to bring pastures to a more productive level.

The improvement of grassland may be brought about in various ways, such as by drainage, the introduction of better strains of grasses and clovers, manuring, cultivation and management, and on the merits of each of these a great deal has already been published. In this paper, however, it is proposed to deal with the recently introduced system popularly referred to as the "new system of grassland management."

Extensive investigations on the manuring of pasture land have previously been carried out in order to determine if it were possible to maintain the high quality of first class grassland, and to raise the poorer pastures to a more productive level.

Of the earlier experiments on this problem the most noteworthy are those which were carried out at Cockle Park, Northumberland, by the late Sir William Somerville. The results obtained from these trials demonstrated the great value of phosphatic fertilizers, particularly basic slag, for the improvement of grass land.

More recent experiments (1 and 2) carried out by the Irish Department of Agriculture on the manuring of pastures have confirmed the results obtained at Cockle Park with basic slag, and have also shown the great value of ground mineral phosphate as a fertilizer for certain types of grassland.

As regards the nitrogenous manuring of pastures, the unfavourable results obtained from the application of sulphate of ammonia to grassland at Cockle Park were for a long time taken as definite evidence that nitrogenous manures were generally unsuitable for the improvement of pastures.

Dr. Somerville in an early report entitled "Influence on the Production of Mutton of Manures applied to Pasture" (3) refers to nitrogenous manures as follows:—"Of all manures that can be applied to grassland, sulphate of ammonia and nitrate of soda are the most rapid in their action. Within a few days of their being applied in spring to a pasture or meadow one may have visible proof that they have already stimulated the plants. But not only are these two manures very rapid in their action, they are also the most powerful in increasing the yield of the herbage of grassland."

However, as a result of further investigations at Cockle Park he considerably modified his views in this respect and stated that (3) "The use of any nitrogenous manure along with phosphate on grassland where phosphate stimulates clover to a marked extent must be condemned as bad practice. No doubt the nitrogenous manure brings early verdure over the pasture, and it does undoubtedly stimulate growth of grass, but the herbage so grown is very deficient in feeding properties, so much so, in fact, that the increased weight of food will produce less meat than the smaller yield grown by phosphate alone. What happens is this, the phosphate stimulates clover, and the grass stimulated by the nitrogen smothers it. The two manures are consequently antagonistic."

This latter conclusion from the Cockle Park experiments carried so much weight that until quite recently nitrogenous manures were seldom or never applied to pasture land unless where the grass was intended for hay.

As a result of the recent production on a large scale of synthetic nitrogenous compounds, nitrogenous manures have been coming on the markets in increasing quantities and at comparatively low prices, and the possibility of the economic use of these manures on pasture land is again being seriously considered.

In order to encourage the use of heavy dressings of sulphate of ammonia and other nitrogenous manures on grassland, demonstration plots were laid down a few years ago in many parts of Great Britain and in this country, from which extremely favourable results were claimed.

The demonstrations were worked on a scheme which was termed "The New System of Grassland Management" and was initiated mainly from a report of the results of an experiment carried out at Hohenheim in Germany. The following is a brief outline of how these demonstrations were carried out.

- (a) The land was treated with a basal dressing of phosphates, potash and also lime where necessary.
- (b) Sulphate of ammonia was applied at intervals throughout the season to a total amount of about four hundredweight per acre.
- (c) The land was divided into sections of convenient size and each section grazed in rotation by the requisite number of animals to ensure that the grass was eaten in an early stage of its growth.

When this scheme is examined it will be seen that there are at least three factors to be considered in the interpretation of the results obtained, namely—

1. The effects of manuring with phosphates and potash.
2. The effect of heavy nitrogenous manuring.
3. The effects of rotational grazing.

Where lime is applied its effect should also be taken into consideration.

Farmers did not always bear this fact in mind when inspecting the demonstration plots, and many of them were consequently carried away with the idea that all the improvement was due to the application of the nitrogenous manures. This was due, no doubt, to the fact that they were not always familiar with the effects of phosphatic manures on pastures, particularly in conjunction with rotational grazing.

Previous experiments already referred to, on the manuring and management of pastures, have definitely demonstrated that the application of phosphates, with or without potash, increased the productivity and stock-carrying capacity of grassland.

Rotation grazing was considered necessary in the scheme to ensure the eating, while in a young state, of the stimulated herbage which otherwise would become rank and coarse.

It has been shown, however, by Dr. Woodman (4) that pasture grass in its early stage of growth is a much more nutritious food than that obtained when it was allowed to become more mature, and that the analysis of the dry matter of young grass is somewhat comparable to that of linseed cake ; so that the rotational system which makes close grazing possible in farm practice is in itself of distinct nutritional value.

It would follow, therefore, that phosphatic and potassic manuring with rotational grazing must have contributed in no small degree to the marked improvement noted in the demonstration plots referred to above.

In order to get more definite information on the new system of grassland management which was being made the subject of more or less intensive propaganda amongst farmers, an investigation into its merits was started at the Albert Agricultural College Farm, Glasnevin (Agricultural Department of University College, Dublin), in the spring of 1927, the object being to obtain more definite information on the contribution of phosphatic and potassic manuring, and of rotational grazing to the total improvement obtained, and in addition to enquire into the economy of heavy applications of nitrogenous manure to pasture land. The investigation was so arranged that not only was the stock-carrying capacity and live weight increase recorded but also the effects of the different treatments on the fertility of the soil.

The area selected was permanent pasture of medium quality, situated about 210 feet above sea level. The soil was a clay loam, adequately drained and having a pH of 7.6. One of the fields selected for the experiment contained approximately 22 statute acres, and the herbage on it was fairly uniform throughout, with the exception of an area of rough pasture situated about the centre of the field. It was divided into three sections marked A, B, C, in diagram I, the rough pasture referred to being divided proportionately between the three sections. Section C was then divided into six sub-plots of equal area, each plot containing a portion of the rough pasture. An adjoining field of good temporary pasture marked D on diagram I was added to the experimental area for the first two years of the investigation. This was also divided into six plots of equal area.

Fences including gateways were erected between the various plots and sub-plots, and where a natural water supply did not exist, a supply was laid on from an elevated tank in the field leading to drinking troughs automatically controlled.

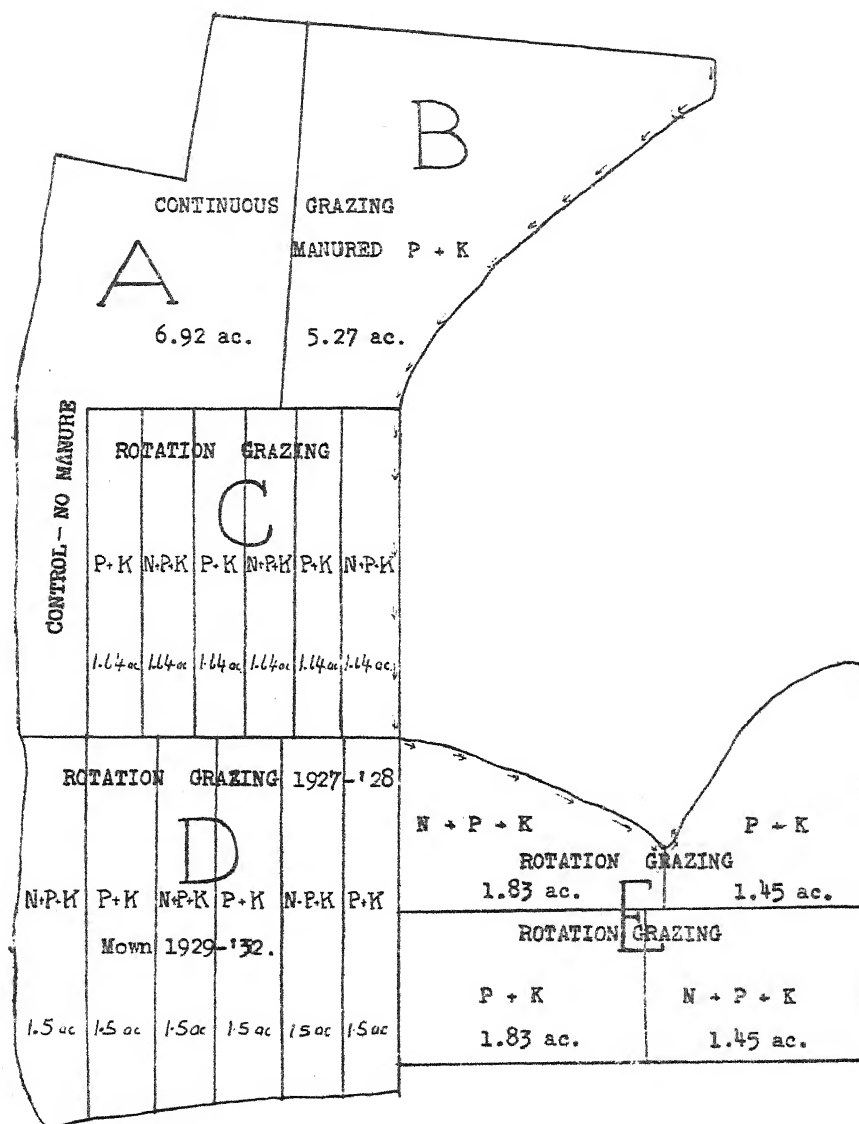
PREVIOUS HISTORY OF THE EXPERIMENTAL AREA.

The experimental area marked A, B, C, diagram I, was under permanent pasture for at least 30 years, and is the property of the College for the last 22 years. In 1915 it was dressed with basic slag at the rate of eight hundred-weight per statute acre, but got no further manuring previous to this investigation. It was grazed each year with cattle and sheep, and occasionally concentrated foods were fed to the cattle.

The area marked D diagram I, was laid down to grass in 1924, was meadowed in 1925 and grazed during 1926. There was a good establishment of grasses and clovers in it, particularly wild white clover. This area was included in the grazing trial for the first two years after which the grass was mown and weighed at intervals during the season, and the productivity measured as yield of grass and dry matter per acre. Further particulars of this part of the experiment will appear later in this report.

An additional area, marked E diagram I, of an adjoining old permanent pasture, and having a similar history to that of A, B, C was then added on to replace area D.

DIAGRAM I.



MANURING.

Section A diagram I, was treated as a control plot, and got no fertilizers throughout the whole experimental period. The other sections B, C, D and E were given a dressing of phosphates and potash each year for a period of four years.

Potash manures are not generally applied to pastures but were included in the basal mixture used in this investigation to remove any doubt regarding lack of potash. In addition the promoters of the "Intensive System" advocated the use of complete mixtures of fertilizers and, since a comparison was to be made between the different sections of this investigation, potassic manures were included in all the manurial dressings.

In addition to this dressing every alternate plot marked N + P + K (diagram I) in the three sections C, D, E was given a heavy dressing of nitrogenous manure, amounting to four hundredweight of sulphate of ammonia or its equivalent as nitro chalk per statute acre each season.

The nitrogenous manures were applied at intervals, it being so arranged that there was a period of five or six days between the manuring of each sub-plot.

In the second year's trial it was decided to use sulphate of ammonia and nitro chalk as the nitrogenous dressing of the N + P + K plots. Accordingly, one half of each sub-plot was dressed with sulphate of ammonia, and the other with nitro chalk, and this procedure was continued for the succeeding years of the manurial trials.

In the application of the nitrogenous manures it was noticed that when sulphate of ammonia was applied in dry weather, a scorching of the plants took place, which effect, however, disappeared in about a week, but it was also noticed that when it was applied during showery weather there were no ill effects. The application of nitro chalk did not result in any scorching of the herbage.

Particulars as to the quantity, and time of application of the manures as well as the cost per statute acre, are shown in the following table.

TABLE I.
1927.

SECTION	First Application FEBRUARY	Second Application APRIL	Third Application MAY	Fourth Application JULY-AUGUST	Approximate Cost of Manures
Control, Continuous Grazing.	—	—	—	—	—
Manured P+K Continuous Grazing	4 cwt. Superphos. 3 „ Kainit	—	—	—	£1 0 8
Manured P+K Rotation Grazing	4 cwt. Superphos. 3 „ Kainit	—	—	—	£1 0 8
Manured N+P+K Rotation Grazing	1 cwt. Sulph. Amm. 4 „ Superphos. 3 „ Kainit	1 cwt. Sulphate of Ammonia	1 cwt. Sulphate of Ammonia	1 cwt. Sulphate of Ammonia	£3 11 7

1928

PLOT	First Application JANUARY—FEBRUARY	Second Application APRIL	Third Application JUNE	Fourth Application AUGUST	Approximate Cost of Manures
Control Continuous Grazing	—	—	—	—	—
Manured P+K Continuous Grazing	4 cwt. Basic Slag 3 „ Kainit	—	—	—	£1 1 0
Manured P+K Rotation Grazing	4 cwt. Basic Slag 3 „ Kainit	—	—	—	£1 1 0
Manured N+P+K Rotation Grazing	4 cwt. Basic Slag 3 „ Kainit 1 „ Sulph/Amm.	1 cwt. Sulphate of Ammonia	$\frac{1}{2}$ cwt. S/Amm. 1 „ N. Chalk (10% Nit.)	$\frac{1}{2}$ cwt. S/Amm. 1 „ N. Chalk (10% Nit.)	£3 10 0

1929

PLOT	First Application FEBRUARY	Second Application APRIL	Third Application JULY	Fourth Application SEPTEMBER	Approximate Cost of Manures
Control Continuous Grazing	—	—	—	—	—
Manured P+K Continuous Grazing	4 cwt. Basic Slag 3 „ Kainit	—	—	—	£1 3 9
Manured P+K Rotation Grazing	4 cwt. Basic Slag 3 „ Kainit	—	—	—	£1 3 9
Manured N+P+K Rotation Grazing	4 cwt. Basic Slag 3 „ Kainit 56 lb. Sulph/Amm. 75 lb. Nitro Chalk	56 lb. S/Amm. 75 lb. N. Chalk	56 lb. S/Amm. 75 lb. N. Chalk	56 lb. S/Amm. 75 lb. N. Chalk	£3 19 0

1930

PLOT	First Application DECEMBER	Second Application MARCH	Third Application JUNE	Fourth Application AUGUST	Approximate Cost of Manures
Control Continuous Grazing	—	—	—	—	—
Manured P+K Continuous Grazing	4 cwt. Basic Slag 3 „ Kainit	—	—	—	£1 3 4
Manured P+K Rotation Grazing	4 cwt. Basic Slag 3 „ Kainit	—	—	—	£1 3 4
Manured N+P+K Rotation Grazing	4 cwt. Basic Slag 3 „ Kainit * { 56 lb. Sulph/Amm. 75 lb. Nitro Chalk	56 lb. S/Amm. 75 lb. N. Chalk	56 lb. S/Amm. 75 lb. N. Chalk	56 lb. S/Amm. 75 lb. N. Chalk	£3 15 4

* Applied in January.

From the foregoing table it will be seen that in the second and subsequent years the superphosphate in the basal manurial dressing was replaced by basic slag. This was considered desirable in view of the acidifying nature of sulphate of ammonia. No manures were applied during the three years subsequent to 1930 in order to investigate the residual effects of the manuring and management of the previous four years.

MANAGEMENT AND STOCKING.

Sections A and B were grazed more or less continuously as is commonly done in farm practice, whereas sections C, D and E were under rotational grazing.

By this system of management Section A acted as a control on Section B and any difference due to phosphatic and potassic manuring was ascertained. Section B was a control on the P + K rotational grazing plots, thereby showing any difference that might be due to rotational grazing. Finally, in the rotational grazing sections, the P + K plots were controls on the N + P + K plots, so that any difference due to the heavy dressing of nitrogenous manures could be determined.

The plots were grazed with cattle and sheep, and the results were recorded in terms of liveweight increase and in maintenance units per statute acre.

The results of trials with grazing animals are sometimes given as "cow days" or "pasture days," but, in view of the difficulty of converting into "cow days" or "pasture days" grazing days for animals of different ages and liveweights, it was decided not to adopt these methods. To arrive at a measure of the maintenance provided by the different grazing sections it was decided to adopt as a basis the maintenance figures given in "Rations for Livestock," Bulletin No. 48 (British Ministry of Agriculture and Fisheries), revised edition, making due allowance for the fact that the animals were grazing on pastures containing different quantities of herbage.

When these figures were applied to all the animals used for the investigation the total amount of maintenance provided per statute acre by each section was obtained.

With the exception of the first year the cattle were all of the shorthorn breed. In the first year, however, there were some Hereford-Shorthorn crosses and some Aberdeen-Shorthorn crosses used, and these were apportioned to each section of the experiment. Where some of the herbage became rough, dry cows were also included.

The cattle for the trial were divided into four groups, one assigned to each section, the selection and grouping being carried out by an experienced judge of livestock who ensured that the groups were as far as possible equal as regards age, quality and liveweight.

The cattle selected for each of the rotational grazing sections were subdivided into two lots, the better quality animals hereafter referred to as "leaders" being in one lot and the older and rougher type of cattle in the other lot and referred to as "followers." The "leaders" were allowed the first graze of the plots and accordingly as they were moved from plot to plot they were replaced by the "followers."

The sheep, mainly of the Roscommon and Galway breeds, were also divided into four comparable groups.

The changing of the cattle and sheep from plot to plot in the rotational grazing sections was carried out at intervals of from three to four days.

All the animals were weighed on three consecutive days and at approximately the same hour each day at the beginning and at the termination of the experiment and the mean of the three weighings taken as the initial and final liveweights respectively. The animals were also weighed at intervals during the experiment in order to see how they were thriving and to obtain the trend of the comparisons.

The plots were grazed with cattle during the late spring, summer and autumn months, and with sheep during the winter months.

When, owing to climatic conditions, it was not possible to keep all the subplots in the rotational grazing sections fully grazed, the rough herbage was cut and weighed. The yield of dry matter per acre was determined and the results converted into terms of starch equivalent and included as extra maintenance.

RESULTS:—LIVEWEIGHT INCREASE AND MAINTENANCE.

As already outlined on Table I, page 230, two manurial dressings were adopted in this investigation, namely phosphates plus potash, and phosphates and potash plus nitrogen.

Phosphate and Potash Manuring:—From observations made and the results obtained the beneficial effects of phosphatic and potassic manuring were pronounced in each year of the trial as shown by the increased stock-carrying capacity and the liveweight production recorded. This increase was more marked in the second and subsequent years than in the first year of the investigation, and this was probably due to the fact that the full effects of the first year's application of phosphates and potash were not realized in that year.

The summarised results for the four years from the Control plot and from the continuous grazing plot manured with phosphates and potash are shown in Table II.

TABLE II.

YEAR	Liveweight Increase per statute acre		Liveweight Increase per statute acre		Maintenance Units per statute acre	
	CATTLE		SHEEP		CATTLE and SHEEP	
	Control	P-K	Control	P-K	Control	P-K
	lb.	lb.	lb.	lb.	Units	Units
1927	394.0	448.0	30.5	42.0	1607	1818
1928	432.0	552.0	24.9	40.4	1749	1906
1929	252.0	397.0	89.0	170.0	1821	1857
1930	359.0	496.0	38.0	52.0	1663	2211
TOTAL ..	1437.0	1893.0	182.4	304.4	6340	7792
Difference due to P-K ..	—	+456.0	—	+122.0	—	+1452

The foregoing figures show that in each year of the investigation higher returns were obtained from the manured section than from the Control. In the returns for cattle it will be seen, however, that the results for 1929 were very much lower than those of the other three years. These comparatively low results were due to the unusually long dry period during the spring and early summer of that year.

The results for sheep in 1929 are higher than those of the other years, due to the fact that in that year the sheep were allowed to graze on the plots up to June, which was much later than in the other years, when the sheep were taken off in March.

The total results for the four years show an increased output to the extent of 456 pounds liveweight increase in cattle, 122 pounds liveweight increase in sheep, and 1,452 maintenance units per statute acre, this result being due to the application of 4 hundredweight of superphosphate, 12 hundredweight of basic slag and 12 hundredweight of kainit (20 per cent. K_2O).

Continuous v. Rotation Grazing.—From the experience gained in the first year of the investigation it was clear that the total number of animals allotted to each section was a very important factor in either increasing or decreasing the final results.

Under ordinary conditions the grazier has to contend with at least two factors, namely, the seasonal variation in the normal growth of grass and the irregularity of growth brought about by abnormal weather conditions. Under the common system of continuous grazing the pastures are rarely stocked to such an extent that a marked shortage of grass is likely to occur, and a fairly ample supply is maintained throughout the normal grazing

season. In fact, at the period of maximum growth the land may be actually understocked and some of the herbage, therefore, may become coarse; although this herbage may not be of the highest nutritive value it nevertheless ensures a supply of food material should a drought ensue.

Where the rotational system of grazing is adopted, much more careful management of the grazing stock is required, since to obtain the full benefits of the system the herbage must be used up in its early stages of growth, when it is most nutritious. This entails the regulation of the number of grazing animals according to a grass supply that is subject to a much greater variation than obtains under the continuous system of grazing.

In this investigation it was found that during the season of maximum growth it was necessary to increase the number of animals originally put on the rotational grazing sections to cope with the rapidly increasing supply of herbage, but, when this flush of growth had passed and the quantity of herbage was not capable of supporting in a thriving condition the maximum number of animals, some of them had to be removed, otherwise they would lose weight and the pasture would also suffer as the result of too bare a grazing. Alternate accommodation for the surplus animals is one of the problems to be contended with in rotational grazing, particularly when favourable conditions for growth may later ensue and extra stock may again be required to keep the pastures adequately grazed.

Finally, there is the problem of winter keep, which is a most important feature of grassland management in these countries where, owing to the usually mild winter obtaining, sheep and store cattle can to a very large extent be outwintered, and in many cases the grass is only to a small extent supplemented with other feeding. There are many advantages associated with the outwintering of store cattle and sheep, and for this reason a certain amount of herbage, tufted or otherwise ("winter keep"), on pastures at the end of the normal grazing season is desirable. It has been observed, however, in this investigation and in other cases where attempts were made to put the intensive system into practice, that the outwintering of stock was seriously affected.

Under the conditions of this investigation rotational grazing resulted in an increased stock-carrying capacity and an increased production during the normal grazing season, namely April to October. In the winter period, however, there was very little difference between the results from the P + K continuous and P + K rotational grazing sections. The plots in the latter section presented a closely grazed appearance at the beginning of winter each year of the investigation, while the continuous grazing plot contained a fair quantity of tufted herbage, most of which the sheep consumed.

Summarised results for the four years 1927 to 1930 are shown in Table III.

TABLE III.

YEAR	Liveweight Increase per statute acre		Liveweight Increase per statute acre		Maintenance per statute acre	
	CATTLE		SHEEP		CATTLE and SHEEP	
	Continuous	Rotation	Continuous	Rotation	Continuous	Rotation
	lb.	lb.	lb.	lb.	Units	Units
1927	448.0	480.0	42.0	53.0	1818	2004
1928	552.0	624.0	40.4	22.5	1906	2427
1929	397.0	397.0	170.0	178.0	1857	2204
1930	496.0	553.0	52.0	46.4	2211	2510
TOTAL ..	1893.0	2054.0	304.4	299.9	7792	9145
Difference due to Rotation Grazing	—	+161.0	—	- 4.5	—	+1353

From an examination of the foregoing figures it will be seen that in each year of the investigation, with the exception of 1929, a higher return for cattle was obtained from the rotational grazing section, showing its advantages over continuous grazing, this being due no doubt to the herbage being consumed in the early stages of its growth.

The prolonged drought in 1929 has already been referred to, and, when comparing the results from the rotation grazing plots with those from the continuous grazing plots for that year, it will be noticed that the gain due to rotational grazing is not as pronounced as in the more normal year. Indeed, there were periods in which such gain was distinctly lower than that from the continuous grazing, as will be shown when the seasonal variation in productivity is being discussed.

The results from the sheep grazing varied from year to year but, on the whole, those from the continuous grazing section were slightly higher than those from the rotation grazing section. The higher returns from both sections in 1929 were due to the fact that the sheep were on the grazing plots until June of that year, as already explained.

The amount of maintenance provided was higher in the case of the rotational grazing section than from the continuous grazing section in each year of the investigation, indicating its higher stock-carrying capacity.

The collective results for the four years show that the adoption of rotational grazing resulted in an increased output to the extent of 161 lb. liveweight increase in cattle, and 1353 maintenance units per statute acre.

The total liveweight increase for sheep over the four years shows a difference of 4.5 lb. per acre in favour of continuous grazing which is equal to the small amount of 1.1 lb. per acre per annum.

NITROGENOUS MANURING.

A great deal of data has recently been published regarding heavy applications of nitrogenous manures to grassland, but the results were for the most part obtained by methods of investigation other than through the medium of the grazing animal. It will be of interest, therefore, to see how the results obtained in this investigation are in agreement with those obtained by other methods of experimentation, allowing for differences due to climatic and other conditions.

From ocular observations made during the investigation it was seen that a marked stimulation of growth resulted from some applications of nitrogen, while from some other applications there was no apparent result. It was clearly demonstrated, however, that the results were seasonal and closely associated with climatic conditions. The most pronounced results from the application of nitrogen were observed during the season of maximum growth of grass, which is generally from the middle of May to about the third week in June and would correspond with the effect of the earlier applications of nitrogenous manures. The third application, which was usually applied in July, was not followed by a corresponding stimulation of grass even when the weather conditions appeared favourable for growth. The final application in August or September always resulted in a stimulation of growth, but this was not by any means so pronounced as that from the first and second applications, and appeared entirely dependent upon the prevailing weather conditions.

The results from the winter grazing showed very little difference between the N + P + K and P + K rotation grazed sections.

Summarised results from the N + P + K and P + K rotation grazed sections are shown in Table IV.

TABLE IV.

YEAR	Liveweight Increase per statute acre		Liveweight Increase per statute acre		Maintenance per statute acre	
	CATTLE		SHEEP		CATTLE and SHEEP	
	P + K	N + P + K	P + K	N + P + K	P + K	N + P + K
	lb.	lb.	lb.	lb.	Units	Units
1927	480	506	53.0	48.5	2064	2400
1928	624	674	22.5	25.5	2427	2718
1929	397	496	178.0	211.5	2204	2153
1930	553	639	46.4	66.0	2510	2883
TOTAL ..	2054	2315	299.9	351.5	9145	10154
Difference due to Nitrogen ..	—	+261	—	+51.6	—	+1009

On examination of the foregoing figures it will be seen that the results from the cattle were higher in the N + P + K section in each year of the investigation, the difference in favour of nitrogenous manuring varying from 26 to 99 lb. liveweight increase per statute acre, the greatest difference being obtained during 1929. The records for that year show, however, that the greater proportion of the increase was obtained during the months of May and June, which correspond to a period of more than average growth, and which was also reflected, but to a lesser extent, in the other sections. This will be discussed more fully when the seasonal variation in the productivity is being considered.

The sheep show a slight difference in favour of the N + P + K section in 1930, an appreciable difference in 1929, in which season the sheep, as already explained, were allowed to graze on all the plots up to June, but no appreciable difference is shown for the other two years.

The maintenance provided by the N + P + K section was higher than that from the P + K section in each year of the investigation, with the exception of 1929, in which the P + K section was greater to the extent of 51 units per statute acre. In the other years the difference in favour of the N + P + K section varied from 291 to 396 units per statute acre.

The total results for the four years show that the application of 11 cwt. of sulphate of ammonia and 7.35 cwt. of nitro chalk resulted in an increased output to the extent of 261 lb. liveweight increase of cattle, 51.6 lb. liveweight increase in sheep, and 1,009 maintenance units per statute acre.

SEASONAL VARIATION IN PRODUCTIVITY.

The determination of the seasonal variation in the productivity of pastures by obtaining the yield of dry matter from herbage cut at intervals during the grazing season has already been investigated by other workers. In this investigation, however, this aspect of pasture problems was attempted through the medium of grazing cattle managed under ordinary farm conditions where the land was subjected to trampling ("hoof cultivation") by animals under various weather conditions and where the undigested constituents of the herbage were returned directly to the land.

During the first two years the management of the grazing animals, particularly with those on the rotational grazing plots, did not permit of the interim weighings of the different lots of cattle being carried out on the same day—a procedure which was, however, adopted in the subsequent years. In view of this fact the seasonal variation was more conveniently expressed as average total daily liveweight increase per statute acre.

The results obtained in each of the four years 1927-1930 are shown graphically in the following diagrams.

DIAGRAM 2.

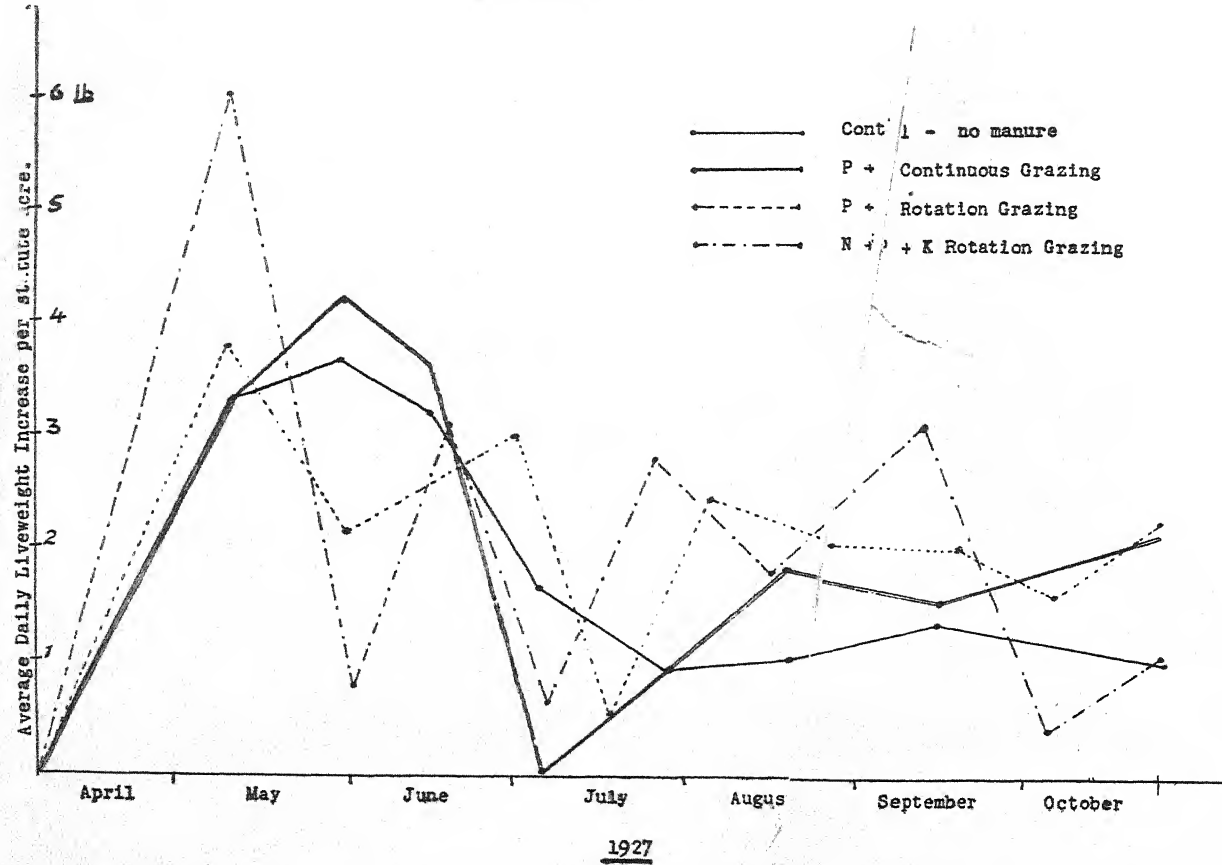


DIAGRAM 3.

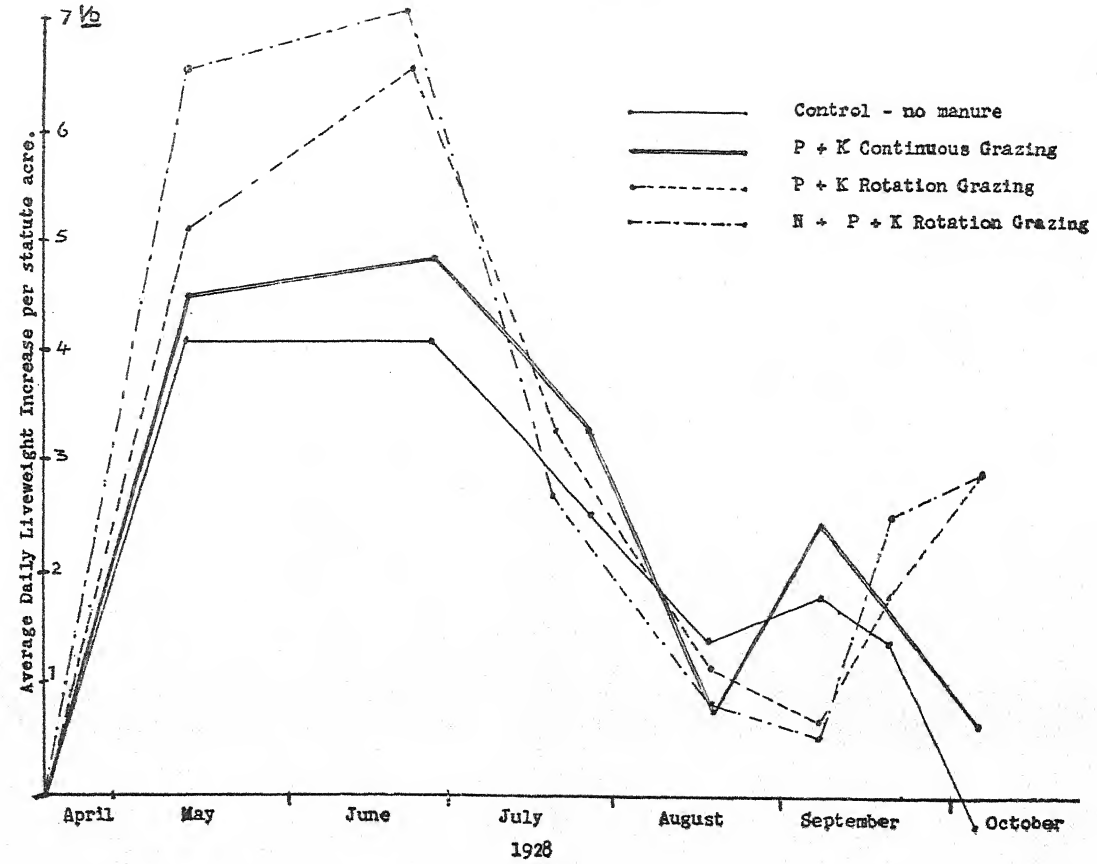
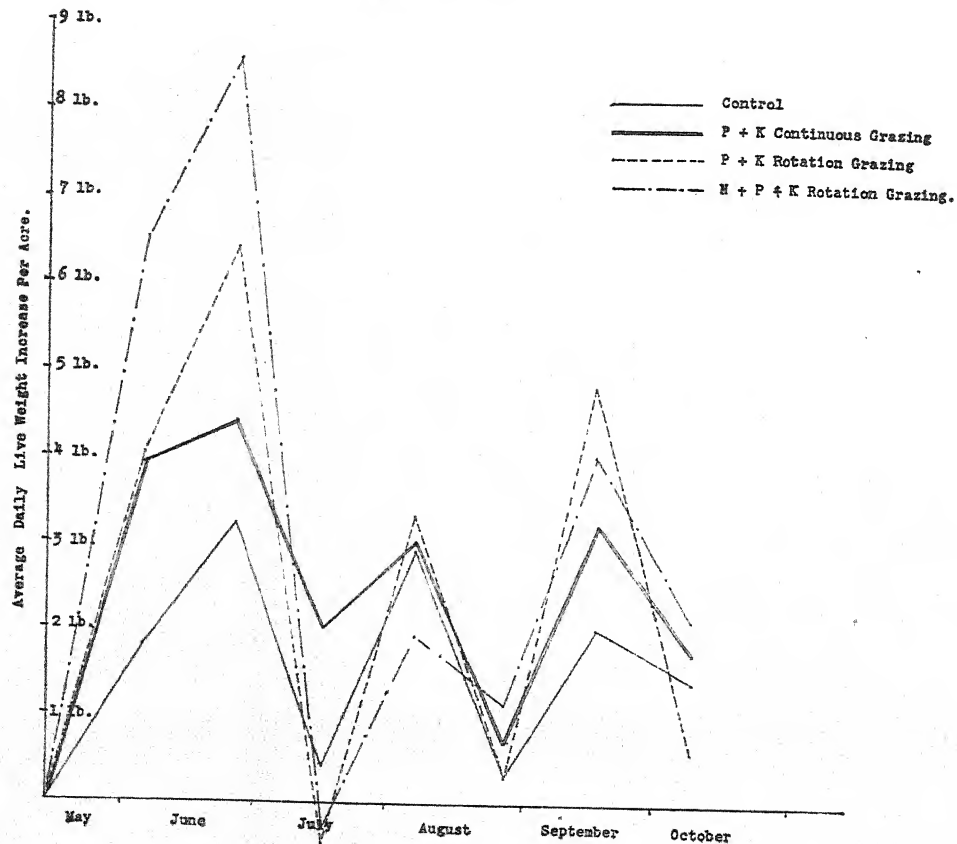
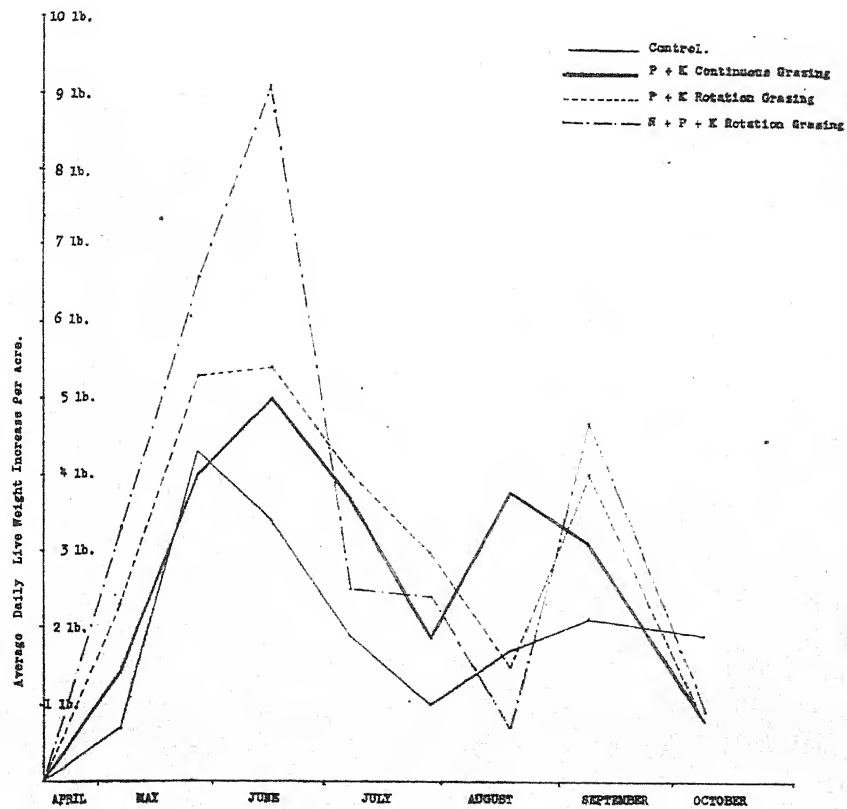


DIAGRAM 4.



1929

DIAGRAM 5.



1930

It will be seen from the diagrams that, with the exception of 1927, the seasonal variations are somewhat similar. Those for 1927, however, show that while the seasonal variation for the Control and P + K continuous grazing section are pretty much on the same lines as those from the same plots in the other years, those from the two rotational grazing sections do not follow the same trend as those from the same sections in the subsequent years.

This was, however, mainly due to the fact that an attempt was made in the first year of the investigation to stock the land sufficiently heavily to ensure that from the beginning of the grazing season the herbage would be kept short and in the highly nutritious stage. It was found, however, that immediately after the peak flush of growth, which corresponded in that year with dry harsh weather, the pastures in the rotation grazing (heavily stocked) sections took on a whitish, parched appearance and could only maintain a smaller number of animals, the remainder having to be removed to another part of the farm, and the pastures taking a considerable time to recover from this condition.

It might be pointed out here that during the period of maximum growth the P + K rotation grazing plots were carrying about twice as many, and the N + P + K rotation grazing plot about three times as many cattle per acre as the Control or no manure plot, and even with this high stocking it was difficult to prevent the herbage on these plots from becoming to some extent tufted. At no period afterwards, however, could more than half the number of animals be accommodated in these sections.

Another feature regarding heavy stocking is that, if sufficient animals were kept on the pastures to consume all or most of the tufted herbage, they would not remain in a thriving condition, and dairy cows or fattening animals could not be subjected to this treatment.

These experiences, together with further observations, convinced the writers that under ordinary farming conditions close grazing should not be interpreted too literally.

The curves relating to the Control (continuously but not intensively grazed) section show a distinct seasonal variation in each of the four years under consideration. There is a period of high productivity extending from about the beginning of May to the middle or end of June, then, from July to about mid-August, growth appears to be restricted, and this is followed by a minor flush period in August and September.

The same variation applies to the other sections, but in a more marked degree, and is particularly pronounced in the plots which were heavily dressed with nitrogenous manures.

The curves for 1929, however, do not quite agree with this statement, as there was a minor response at the period when the yields were depressed in the other years. This was due to the fact that rain at mid-July, following the warm dry conditions of the previous months, resulted in vigorous growth on all the plots, including the control.

Attention is, however, directed to the fact that, whereas a marked response was obtained from the early application of nitrogenous manure, there was practically no response from the mid-season, and only a slight response from the early autumn, applications.

CLIMATIC CONDITIONS.

On comparing one year's results with another, and also the seasonal variation in productivity from year to year, it will be seen that in no two years were similar results recorded. Since the experiment was carried out on the same lines each year, these differences would appear to be due to variable climatic conditions, particularly rainfall and temperature, which occurred during the course of the experiment, and these factors must be taken into consideration in the interpretation of the foregoing results.

Rainfall. This is a most important factor in the growth of crops and particularly in the case of pastures. The annual rainfall may be more than sufficient for pasture requirements, but its distribution throughout the year is often not as favourable as could be desired for maximum growth. The greater bulk of the annual rainfall may be obtained during the winter months when it is least required, and this may result in a partial scarcity of water in the soil during the usual active growing season, with consequent reduction in the quantity of herbage produced. On the other hand, an abnormally heavy rainfall coupled with heat during the active growing season would result in an increased production of herbage, but it may be of lower feeding value.

Both of these effects were observed during the progress of this investigation and were reflected in the results obtained.

The annual rainfall for the Glasnevin district for each year of this investigation and its distribution throughout the year are shown in Table V. following.

TABLE V.

YEAR	Total Rainfall	DISTRIBUTION											
		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.
1927	32.79	2.10	1.92	3.16	1.22	0.82	2.47	3.34	6.04	3.45	2.99	2.88	2.40
1928	30.03	2.51	2.57	4.21	1.15	1.72	4.38	1.32	2.67	0.72	2.04	3.74	3.00
1929	28.14	1.32	2.26	0.26	1.23	1.35	1.28	2.22	4.91	0.37	2.59	4.38	5.97
1930	38.21	3.50	1.26	4.20	1.14	2.30	1.83	3.02	5.15	6.29	3.48	2.72	3.32

An examination of the foregoing figures shows that the annual rainfall for the years 1927 to 1930 varied from 28.14 inches to 38.21 inches, and that with the exception of 1929 the rainfall was fairly well distributed throughout the year, particularly during the months that may be regarded as the normal period for the growth of pastures. The 1929 season may be regarded as an abnormal one, the spring and early summer period being exceptionally dry, and the growth of herbage was, therefore, seriously affected, resulting in a partial scarcity of grass during the latter half of June and the first half of July—until rain fell about the middle of that month. This was most pronounced in the rotation grazing sections, particularly in the N + P + K plots. These ill effects are shown in the results recorded for that year.

The rainfall records also show that in June 1928 and in August 1927, 1929 and 1930 the rainfall was abnormally high, which, coupled with warm weather conditions, resulted in a good growth of herbage being produced on all the plots, but it was particularly luxuriant on the N + P + K section. The liveweight increase obtained, however, was somewhat disappointing, and in some cases was not equal to that from other sections on which the herbage appeared less luxuriant.

It is evident, therefore, that the annual rainfall and its distribution, particularly during the season of active growth, is an important consideration and would appear to be a limiting factor in the improvement of pastures by the use of artificial manures, even where a complete dressing is applied.

Temperature.—This country is particularly favoured with a temperate climate and rarely suffers from extremes of heat or cold. There are times, however, when heat or cold may unduly influence the growth of pastures even during the normal growing season. During the progress of this investigation it was observed that cold harsh weather, which sometimes obtained during the months of April, May, and occasionally June, had a considerable deterring effect on growth, and entirely prevented the production of the "early bite" associated with intensive manuring of grass land. On the other hand, the occurrence of frost as early as September had somewhat similar effects and shortened the duration of the growing season.

It was observed that the effects of abnormal heat were not so marked unless the heat was accompanied by a prolonged drought when, as in the early part of 1929, growth was much reduced. If the heat was accompanied by heavy rainfall, as in August 1927, 1929 and 1930, a luxuriant growth of herbage of apparently low feeding value was produced.

Finally, there is the question of winter growth, which is almost entirely dependent upon temperature. During mild winters a reasonable amount of growth was observed, while in cold, harsh winters growth was at a standstill.

Temperature, therefore, also acts as a limiting factor, and it would appear that even heavy dressings of artificial manures in spring will not produce the "early bite" unless climatic conditions are favourable for growth.

RESIDUAL RESULTS.

In carrying out this investigation it was regarded as essential to apply a complete dressing of artificial fertilizers to the N + P + K plots each year, but, since a comparison was to be made with the phosphatic and potassic manuring, it was also necessary to apply these manures to the P + K plots in each year of the investigation.

In order to enquire into the residual effects (values) of the manures applied during the years 1927 to 1930, under the different systems of grazing, as well as to obtain some information on the advisability of an annual application of these fertilizers, it was decided to continue the investigation for a further period of three years without any application of manures.

The experiment was accordingly continued over the period 1931 to 1933 inclusive on similar lines, from the point of view of stocking and management, to that of the previous four years, and for convenience the same notation was used for the different plots. The results recorded are shown in Table VI.

TABLE VI.

YEAR	Liveweight Increase per statute acre		Liveweight Increase per statute acre		Maintenance Units per statute acre	
	CATTLE		SHEEP		CATTLE and SHEEP	
	Continuous Grazing		Continuous Grazing		Continuous Grazing	
	Control	P+K	Control	P+K	Control	P+K
	lb.	lb.	lb.	lb.	Units	Units
1931	308	376	45	99	1786	1926
1932	287	288	73	71	1524	1905
1933	217	256	—	—	1723	1790
TOTAL ..	762	920	118	170	5033	5621
	P+K Continuous	P+K Rotation	P+K Continuous	P+K Rotation	P+K Continuous	P+K Rotation
	lb.	lb.	lb.	lb.	Units	Units
1931	376	277	99	99	1926	2041
1932	288	339	71	107	1905	2191
1933	256	323	—	—	1790	2070
TOTAL ..	920	939	170	206	5621	6302
	Rotation Grazing		Rotation Grazing		Rotation Grazing	
	P+K	N+P+K	P+K	N+P+K	P+K	N+P+K
	lb.	lb.	lb.	lb.	Units	Units
1931	277	302	99	123	2041	1983
1932	339	399	107	98	2191	2228
1933	323	305	—	—	2070	1967
TOTAL ..	939	1006	206	221	6302	6178

From the foregoing figures it will be seen that the results generally are lower than those of the previous four years, the reduction in productivity being particularly noticeable in the case of the plots that had been previously manured.

While part of this reduction must be attributed to unfavourable climatic conditions, the greater proportion of it was due to declining fertility.

Under the conditions of this investigation it was observed, however, that :—

- I. In each of the three years under review the P + K continuous grazing plot gave higher increases than the Control, indicating the residual value from the previous application of phosphates and potash.
- II. With the exception of 1931 when climatic conditions were rather unfavourable for growth the increased productivity, as a result of rotational grazing, was somewhat of the same order as in the previous four years, which would indicate a similarity in the level of fertility in the P + K rotation grazing plots and in the P + K continuous grazing plots.
- III. The level of fertility in the N + P + K plots appeared to be higher than that of the P + K rotation grazing plots up to the end of the second year. In the final year, however, the results from the N + P + K plots were somewhat lower than those from the P + K, which would indicate that in the former plot the level of fertility was falling at a greater rate than in the latter plots.

THE EFFECT OF HEAVY NITROGENOUS MANURING ON THE YIELD OF GRASS.

In view of the information obtained from the grazing trials of 1927 and 1928 it was considered desirable to record the results from heavy nitrogenous manuring in terms of yield of grass and dry matter per statute acre.

Accordingly, as pointed out on page 228, the portion of the experimental area marked D, Diagram I, consisting of six plots of 1.5 acres each, was reserved for this trial at the end of the 1928 grazing trials.

MANURING.

In February 1929 and 1930 all the plots were manured with four hundred-weight of mineral phosphate and three hundredweight of kainit per statute acre. In addition, the three plots marked N + P + K received applications of nitrogenous manure amounting to two hundredweight in 1929 and three

hundredweight in 1930 of sulphate of ammonia or its equivalent as nitro chalk per statute acre, applied in separate applications of one hundred-weight each.

The first application of nitrogenous manure was applied in March of each year, the subsequent dressings being applied after the first cutting in 1929 and after the first and second cutting respectively in 1930.

At the end of the 1930 grazing trials it was decided to continue that investigation without the application of manures in order to enquire into the residual effects of the treatments of the previous four years. It was also arranged to continue this experiment for a period of two years without any manures. Accordingly, no manures were applied in 1931 and 1932.

RESULTS.

The plots were mown three times during each season, and in cutting it was arranged that each comparable pair of plots was mown simultaneously, the grass being collected immediately, weighed and sampled for dry matter analysis. In this way the total yield of freshly-mown grass was obtained and the yield of dry matter per statute acre determined.

Particulars as to the dates of cutting and yields of freshly-mown grass and dry matter per statute acre are given in Table VII following:—

TABLE VII.

		N-P-K		P+K	
		Yield per statute acre. Average of three plots		Yield per statute acre. Average of three plots	
		Grass	Dry Matter	Grass	Dry Matter
1929					
1st Cutting—27th–29th May	..	Tons 8.275	Tons 1.740	Tons 7.775	Tons 1.656
2nd „ 27th–28th Aug.	..	4.200	0.727	4.275	0.763
3rd „ 14th–15th Oct.	..	1.275	0.258	1.200	0.258
TOTAL ....	..	13.750	2.725	13.250	2.677
1930					
1st Cutting—16th–19th May	..	7.650	1.487	6.887	1.326
2nd „ 14th–17th July	..	4.687	1.262	3.963	1.004
3rd „ 2nd–5th Oct.	..	4.425	0.869	3.786	0.750
TOTAL ..	..	16.762	3.618	14.636	3.080
NO MANURES					
1931					
1st Cutting—21st–26th May	..	7.113	1.584	7.025	1.629
2nd „ 16th–18th July	..	1.425	0.393	1.650	0.416
3rd „ 18th–20th Oct.	..	1.825	0.502	1.837	0.535
TOTAL ..	..	10.363	2.479	10.512	2.580
1932					
1st Cutting—3rd–6th June	..	3.787	0.956	3.837	0.971
2nd „ 19th July	..	0.587	0.186	0.537	0.174
3rd „ 27th Oct.	..	1.475	0.479	1.463	0.461
TOTAL ..	..	5.849	1.621	5.837	1.606

Manuring.—An examination of the foregoing figures will show that in 1929 the difference due to nitrogenous manuring amounted to ten hundred-weight of grass and 0.96 cwt. of dry matter per statute acre. It will also be seen that this difference was obtained from the first cutting, the yields at the second cutting being slightly in favour of the P + K plots, while there was no difference between the yields obtained at the third cutting.

It will be seen, therefore, that there has been no response from the second application of nitrogenous manure in this year. As previously pointed out this was, on the whole, a season of poor growth, a prolonged period of dry weather obtaining about the time of the second application of nitrogenous manure. The total increase in yield obtained would hardly cover the cost of the manures used.

The total results for 1930 show a greater difference due to nitrogenous manuring than in 1929, amounting to 2.126 tons of grass and 0.53 tons of dry matter. This was due to the fact that climatic conditions were much more favourable for growth in 1930 than in 1929. The yields obtained at the individual cuttings in 1930 from the N + P + K plots were all higher than those from the P + K plots, and indicate that the increased output would at least pay for the cost of the nitrogenous manures used.

No Manuring.—When the yields for 1931 are compared with those of 1930 it will be seen that there is a decrease of about 6.4 tons of grass and 1.14 tons of dry matter in the case of the N + P + K section, and of about 4.1 tons of grass and 0.50 tons of dry matter in the case of the P + K section. It will also be noticed that there is a further decrease in the results for 1932 indicating that the residual value of the manures applied in the previous years was very small in the case of the phosphatic and potassic manures and that there was no residual value in the case of the nitrogenous manures.

SUMMARY.

An investigation on the "Intensive Management of Pastures" is outlined and an attempt is made to analyse the total results obtained and to see how far each of the following contributed (a) phosphatic and potassic manuring, (b) heavy nitrogenous manuring and (c) rotational grazing, and the following is a brief summary of the results obtained :—

Phosphatic and Potassic Manuring.—The application of these manures resulted in an increased productivity measured in terms of liveweight increase and stock-carrying capacity, contributing about fifty per cent. to the total increase obtained from the "intensive system." Furthermore, the herbage was considerably improved and was not affected to the same extent by adverse climatic conditions as that which had received nitrogenous manures in addition.

Nitrogenous Manuring.—The effects of heavy applications of nitrogenous manures resulted in the stimulation of growth, bringing about an increased

productivity, and in the suppression of clovers and weeds. Attention is directed to the results obtained from three different aspects, namely, live-weight increase and stock-carrying capacity, seasonal variation in productivity, and yield of dry matter. The results expressed as liveweight increase and maintenance from the $N + P + K$ plot were, in each of the years 1927 to 1930, higher than those from the $P + K$ plots. The analyses of the results, would, however, show that only about thirty per cent. of the total increase obtained from the "intensive system" can be attributed to nitrogenous manuring. The seasonal variation in productivity shows that the greater proportion of the increase due to nitrogenous manuring was obtained during the early months of the normal grazing season. This would indicate that the economic value of perhaps the second and, undoubtedly, the third and fourth applications of nitrogenous manures is extremely doubtful.

The prolongation of the normal grazing season, as a result of the heavy nitrogenous manuring, was not apparent in this investigation and appears to be largely dependent upon climatic conditions.

The value of the increased yield of dry matter from pastures manured with nitrogenous manures, and from which the grass was repeatedly mown, barely covered the cost of these manures.

Rotational grazing.—This proved to be a most important feature of the investigation as the results obtained were capable of being considerably influenced by the method in which it was carried out. Special attention is drawn to the allocation of the number of grazing animals and to the disadvantages associated with "overgrazing" and "undergrazing." Attention is also directed to what the writers consider a serious difficulty in connection with rotational grazing, namely the increasing or decreasing of the number of grazing animals to ensure that the herbage is used up at a proper stage of growth and to avoid grazing the pastures too closely. In view of the great variation in the growth of grass, this difficulty cannot be avoided and, for that reason alone, it is doubtful whether rotational grazing as it is usually interpreted (namely, the consumption of the herbage in its early stages of growth) would be a practical method of grazing.

"Winter keep" in pastures is also discussed, and it is indicated that, with the rotation system, "winter keep" for cattle is almost impossible and for sheep extremely doubtful.

The results obtained over the four years show that rotational grazing contributed about twenty per cent. to the total increase obtained from the intensive system.

Seasonal variation in productivity.—Attention is directed to the normal seasonal variation in the growth of grass, and it is shown that there are two main periods of growth in pastures—a period of maximum growth extending from about mid-May to mid-June and another period from about mid-August to the first or middle of September, depending upon weather con-

ditions. The period from mid-June to mid-July is usually one of poor growth. It is also clearly shown that the greater proportion of the increased productivity for heavy nitrogenous manuring is obtained during the period of maximum growth.

Climatic conditions.—During the course of the investigation it was seen that climatic conditions play an important part in grassland management. The annual rainfall, and particularly its distribution throughout the normal grazing season, appears to be of the utmost importance since it influences the quantity and the quality, particularly the dry matter content, of the herbage.

Attention is directed to the occurrence of cold, harsh weather and late frosts in spring, or even occasionally in early summer, and of early frosts in the autumn, which reduce the duration of the normal grazing season, while cold, harsh weather during the winter months influences the amount of herbage available for the outwintering of stock.

Climatic conditions may, therefore, influence or act as a limiting factor on the growth of grass.

Attention is drawn to the fact that as, for the purpose of this investigation, it was necessary to separate the various plots by wire fences, the experimental animals were deprived of (a) the shelter from cold rain and harsh winds that would normally be provided by hedges, banks, etc., and (b) protection during the gadding season. Where these disturbing factors do not obtain, results differing from those recorded in this investigation may appear.

It must be pointed out, however, that the adoption of any system of rotational grazing on the average farm necessitates the division of the existing fields into areas or plots of suitable size.

CONCLUSIONS.

The following conclusions have been deduced from the results obtained in the foregoing investigation and from the observations made during its progress :—

I. *Phosphatic and Potassic Manuring.*—In contributing about fifty per cent. to the total increases obtained from intensive manuring and management the importance of these manures in the management of grassland is clearly demonstrated.

With pastures grazed continuously or rotationally, an application of phosphates and potash every third or fourth year is indicated in order to maintain a high level of fertility and productivity. On the other hand, where the grass is to be repeatedly mown, annual applications are advisable.

II. *Heavy Nitrogenous Manuring.*—Nitrogenous manures resulted in a stimulation of growth and increased productivity during the season of maximum growth, but applications other than one to one-and-a-half hundred-weight per acre in spring cannot be regarded as economical.

This system of grassland management appears to exert a greater draining effect on the fertility of the soil than the other treatments investigated.

III. *Rotational Grazing.*—This method of grazing, when carried out as in this investigation, does not appear a practical one in view of the many difficulties associated with it, particularly as regards stocking and "winter keep."

A modified system may, however, be adopted with advantage in which the allocation of the number of grazing animals is based on the experience gained during normal, or perhaps rather dry, years. During periods of more than average growth, part of the grazing area could be reserved for silage or hay, the aftermath being later used for grazing. Provision should, however, be made for "winter keep."

IV. *Seasonal Variation in Productivity.*—There are normal periods for the growth of grass and these will not be influenced by manuring or management. Climatic conditions, however, constitute a controlling factor and may even act as a limiting factor in grassland experiments.

The writers are indebted to Mr. G. F. O'SULLIVAN, M.Sc., Agricultural Chemistry Department, Albert Agricultural College, for supplying the Dry Matter Analyses used in connection with this investigation.

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REPORT OF THE SEED PROPAGATION DIVISION, 1936.

As in previous years, the bulk of the barley propagation work was carried on at the Cereal Station, Ballinacurra, County Cork, in close collaboration with Messrs. A. Guinness, Son and Co., Ltd., at whose Experimental Maltings the malting tests were conducted. The work consisted of the usual pure line propagations, large scale variety, half-drill-strip and other experiments.

Pure line propagations of Black Tartary oats were conducted at the Cereal Station, and extension plots of Victory II and Glasnevin Success III were grown in the neighbourhood of Ballinacurra.

WEATHER CONDITIONS :

January and February of 1936 were distinguished by very heavy rainfall, which amounted to $12\frac{1}{2}$ inches, so that ground was quite unfit for sowing or indeed cultivation work of any kind until the middle of March. The rainfall in March, April, May and the first half of June was appreciably below average. The ground dried and hardened early in spring and cold harsh winds, particularly in April and May, parched young corn and retarded early growth. July brought $4\frac{1}{2}$ inches of rain and a big deficiency in sunshine with low temperatures. Violent winds on the 22nd and 23rd of the month caused much lodging of corn. Towards the end of August the weather improved considerably, so that harvesting and thrashing were completed under quite fair conditions. The month of October was the driest October for fourteen years. The yield of barley was much below that of last year, but the quality was higher than was anticipated. The yield and quality of oats were also much below the average.

BARLEY.

The two strains Spratt-Archer 37 No. 3 and Spratt-Archer 37 No. 4 were again propagated by what has become known as the five-grain method, i.e., the sowing of five grains from each of twenty-five plants in the single line. Each of the other varieties was propagated by sowing the single line from a bulk of seed obtained by taking a single ear off each plant in the single line in 1935.

The following were grown in the Old Cage :—

- (a) A number of selections from Spratt Archer 37 No. 3 x Victory, Kenia x Neils Franchen and Kenia x D.S.K. Binder, in the second, or F.2. generation.
- (b) Spratt-Archer 37 No. 3, Spratt-Archer 37/9 and Goldthorpe derived from single ears and the grains sown in the order in which they were located on the rachis.

(c) Single lines of 58 selections, namely :—

Spratt-Archer 37/6, No. 7.
 Spratt-Archer 37/12/41.
 Spratt-Archer 37/17/52.
 Archer-Goldthorpe 4/5/1.
 Spratt.
 Archer.
 Goldthorpe.
 Old Irish.
 Abed Rex x Spratt-Archer 6/3/2.
 Donegal 2 rowed No. 1.
 Burton Malting.
 Victory.
 D.S.K. Binder.
 Plumage Archer.
 Duck Bill.
 Hybrid No. 1C.
 Hybrid No. 4A.
 Hybrid No. 4 B1.
 Hybrid No. 7.
 July 6 rowed.
 Mansholt's 6 rowed.
 Beaven's F. 112.
 Beaven's 49/2/3, 49/14/3, 49/10/1, 49/24/7, 50/9/1, 50/1/7.
 B.244.
 Donegal 6 rowed.
 Norwegian 6 rowed.
 Glabron.
 Black.
 Black Russian.
 Pearl.
 Neils Franchen.
 Naked Barley
 Student 2/1.
 Student 2/3.
 Student 2/8.
 Golden Archer 1.
 Golden Archer 2.
 Golden Archer 35/51.
 Spratt-Archer 37 No. 3 x July 6 rowed 2.
 Spratt-Archer 37 No. 3 x July 6 rowed 22.
 Spratt-Archer 37 No. 4 x July 6 rowed 1.
 Spratt-Archer 37 No. 4 x July 6 rowed 16/2.
 D.S.K. Binder x July 6 rowed 1/2.
 D.S.K. Binder x July 6 rowed 2.
 D.S.K. Binder x July 6 rowed 3.

D.S.K. Binder x July 6 rowed 7.
 Spratt-Archer 37 No. 3 x Goldthorpe 6/1.
 Spratt-Archer 37 No. 3 x Goldthorpe 27/1.

Garden plots of the following varieties were grown in the Cage Field :—

Spratt-Archer 37 9.
 Spratt-Archer 37 No. 3 (5 grains each from 25 plants).
 Spratt-Archer 37 No. 4 (5 grains each from 25 plants).
 Spratt-Archer 37 12, 41.
 Spratt-Archer 37 17, 52.
 Abed Rex x Spratt-Archer 6 3 2.
 Donegal 2 rowed, No. 1.
 July 6 rowed.
 Student 2 1.
 Student 2 3.
 Student 2 8.
 Golden Archer 1.
 Golden Archer 2.
 Spratt-Archer 37 No. 3 x July 6 rowed 2.
 Spratt-Archer 37 No. 4 x July 6 rowed 1.
 D.S.K. Binder x July 6 rowed 2.
 D.S.K. Binder x July 6 rowed 3.
 D.S.K. Binder x July 6 rowed 7.
 Spratt-Archer 37 No. 3 x Victory 1 1.
 Spratt-Archer 37 No. 3 x Victory 2.
 Spratt-Archer 37 No. 3 x Victory (bulk).

*Goldberg.

The Field Plots comprised eighteen of the same varieties which were grown in the Garden plots and also a narrow eared variety called Abed Maja which was received from Denmark. This variety was, however, so badly infected with Loose Smut (*Ustilago nuda*) that it was cut out and burnt.

The First Pedigree plots were grown on the Ramhill Farm of Messrs. John H. Bennett, Ltd., and comprised the following varieties :—

Spratt-Archer 37 No. 3.	4 acres.
July 6 rowed.	$\frac{1}{3}$ acre.
Spratt-Archer 37 No. 3. Dr. H. Series.	$\frac{1}{4}$ acre.
Golden Archer 1.	$\frac{1}{4}$ acre.
Golden Archer 2.	$\frac{1}{4}$ acre.
D.S.K. Binder x July 6 rowed 3.	$\frac{1}{4}$ acre.
Abed Rex x Spratt-Archer 6/3/2.	1 acre.
D.S.K. Binder.	1 acre.
Golden Archer 35/51.	1 acre.

*This is a two rowed narrow-eared variety, thought to be synonymous with Gold, which is a Swedish variety.

Second Pedigree plots of Spratt-Archer 37 No. 3 were grown on five farms in the neighbourhood of Ballinacurra, and the produce of these will be available for distribution as pedigree seed in 1937.

Under the Department's scheme for the distribution of pedigree seed barley to the Irish Maltsters' Association and others interested in the propagation and distribution of seed barley, 382 barrels of pure line Spratt-Archer 37 No. 3 were distributed in 1936 to the following :—

	Brls.	Sts.
Joshua L. Nunn, Castlebridge, Wexford ..	10	0
P. J. Roche & Sons, Enniscorthy, Wexford ..	10	0
The Birr Maltings, Ltd., Birr, Offaly ..	12	0
R. & G. Gray, Ltd., Market Square, Dundalk ..	3	0
J. P. Kearney, Wilville House, Dundalk ..	12	0
F. A. Waller & Co., Ltd., Banagher, Offaly ..	9	0
Joshua Watson & Co., Ltd., Carlow ..	26	0
Minch, Norton & Co., Ltd., Stradbally, Laoighis ..	20	0
Minch, Norton & Co., Ltd., Athy, Kildare ..	40	0
Minch, Norton & Co., Ltd., Nenagh, Co. Tipperary	15	0
Minch, Norton & Co., Ltd., Bagenalstown, Carlow	15	0
Minch, Norton & Co., Ltd., Barracore, Goresbridge	10	0
George Read & Co., Roscrea, Co. Tipperary ..	20	0
W. J. O'Keefe & Sons, Wexford ..	6	0
N. Hardy & Co., Park Street, Dundalk ..	6	0
P. & H. Egan, Ltd., Tullamore, Offaly ..	14	0
J. & A. Tarleton, Ltd., Tullamore, Offaly ..	15	0
Robert Gibney & Co., Ltd., Portlaoighise ..	10	0
John Bolger & Co., Ferns, Wexford ..	13	0
Cairnes, Ltd., Drogheda, Co. Louth ..	10	0
Beamish & Crawford, Ltd., Cork ..	5	0
A. J. M. Reeves, Athgarvan, Newbridge, Co. Kildare	4	8
Robert Perry & Sons, Ltd., Rathdowney, Laoighis	5	0
McKenzies, Ltd., Camden Quay, Cork ..	10	0
D. E. Williams, Ltd., Tullamore, Offaly ..	50	0
D. Smithwick & Co., New Street, Kilkenny ..	5	0
Captain Bruen, Oak Park, Carlow ..	2	0
Cox & Co., Ltd., Dundalk, Co. Louth ..	2	0
William Power & Sons, Waterford ..	15	0
Bride Valley Co-op. Stores, Tallow, Co. Waterford ..	2	0
P. J. Connolly, Esq., Ravensdale, Dundalk ..	3	8
T. Wade, Esq., Straffan, Co. Kildare ..	2	0
Total ..	382	0

In addition to the above, pure line stocks of five other varieties were sent to Athenry, Co. Galway, and Moville, Co. Donegal, where they were propagated for further distribution in those areas in 1937. These varieties were as follows :—

		Brls.	Sts.
D.S.K. Binder			
To the Agricultural School, Athenry, Co. Galway		14	4
Victory			
To the Agricultural School, Athenry, Co. Galway		14	10
July 6 rowed			
To the Agricultural School, Athenry, Co. Galway		5	11
Donegal 2 rowed No. 1.	}	1	10
Donegal 6 rowed		1	3
To Mr. J. Denny, A.A.O., Moville, Co. Donegal.			

All the seed barley distributed under this scheme was treated with Agrosan powder before despatch from Ballinacurra.

INSPECTION OF GROWING CROPS.

Under the Scheme for the distribution of pedigree seed barley, the Department had certain growing crops of Spratt-Archer 37 No. 3 inspected. For inspection purposes these crops were divided into three classes :—

(1) crops grown from pedigree seed obtained from the Ballinacurra Cereal Station in 1936 ; (2) crops grown from seed which was the produce of pedigree seed obtained from Ballinacurra in 1935 ; and (3) crops grown from commercial seed of Spratt-Archer 37 No. 3.

A total of 5,115.25 acres was inspected, and of this, 4,566 acres were passed as likely to produce grain suitable for seed purposes. Of the 582 acres inspected under class (1) 569.75 acres were passed as suitable for seed purposes, 2.1 per cent. being rejected. Of the 3,219.75 acres inspected under class (2), 305 acres were rejected, i.e., 9.4 per cent. and of the 1,313.5 acres inspected in class (3), 232 acres or 17.6 per cent., were rejected. These rejections are at a somewhat higher rate than in 1935, which is mainly accounted for by the number of crops which had been damaged by the weather. Smut was only reported as present at seven centres, and in nearly all of these cases other barley had been sown adjacent to it in the field. It is desirable that those firms who co-operate in this scheme should take great care in selecting the growers of their pedigree seed barley.

LARGE SCALE VARIETY EXPERIMENTS.

These experiments were carried out at ten centres in seven counties, namely—Cork, Tipperary, Kilkenny, Offaly, Kildare, Louth and Wexford. The seed used in the experiments was drawn from the produce of the first pedigree plots at the Cereal Station, Ballinacurra, in 1935. The rate of seeding throughout was, approximately, ten stones per statute acre. The seed was dressed with Agrosan powder at the rate of 8 ozs. per barrel of seed. The area of each plot was three-quarters of a statute acre.

Spratt-Archer 37 No. 3 was used as a standard, and of the other two varieties included in the trials, Golden Archer 35/51 was produced by Dr. Beaven at Warminster and Abed Rex x Spratt-Archer 6/3/2 at the Albert Agricultural College. The produce of all the plots was malted and tested at the Experimental Maltings of Messrs. A. Guinness, Son and Co., Ltd.

Table 1 gives the names and addresses of the growers, the nature of the soil and sub-soil, the crops which were grown in the two previous seasons and the dates of sowing and harvesting.

At the Athy centre the plots were sown on March 16th, after which date the weather broke and no more plots were sown until April. On the whole the sowing was later than usual. The cold and wet weather during July and August was unfavourable to barley and the crops ripened late and unevenly. The season seemed particularly unsuited to the Abed Rex Hybrid which had appeared promising for the past four years. This year it was slow in ripening and was of an uneven character. The Golden Archer ripened about the same time as Spratt-Archer 37 No. 3, although in 1935 it was about five days later than it.

As regards yield, Spratt-Archer 37 No. 3 retained its superiority, with an average yield of eleven barrels twelve stones per statute acre, as compared with eleven barrels two stones, from Golden Archer and ten barrels eleven stones from Abed Rex x Spratt-Archer 6/3/2.

In Table II are set out the weights of grain per statute acre and the average value as determined by several independent valuers.

Table III gives the analyses of the grain produced off each plot.

It will be observed that whilst Spratt-Archer 37 No. 3 produced a heavier yield than either of the other varieties at all centres except one, it was in all cases inferior to the other two varieties in respect of bushel weight and weight per 1,000 corns. The percentage of nitrogen was at every centre lower in Spratt-Archer than in either of the other two varieties.

TABLE I.
Large Scale Barley Variety Experiments, 1936.

Centre	Name and Address of Grower	Description of Soil	Previous Crop	Date of Sowing	Date of Harvesting
1	J. Tait, Rostellan, Co. Cork	Medium Loam Sub-Soil Shale	1934 Barley 1935 Beet	April 9th	Aug. 22-24th.
2	M. Carroll, Belleen, Nenagh	Medium Loam Sub-Soil Lime-stone	1934 Barley 1935 Beet	April 28th	Sept. 9-12th.
3	J. Bryan, Dunbell, Kilkenny	Medium Loam Sub-Soil Lime-stone	1934 Roots 1935 Wheat	April 18th.	Aug. 24-26th.
4	William Watkins, Coolnagrower, Birr, Offaly	Light Loam Sub-Soil, Lime-stone	1934 Barley 1935 Roots	April 27th	Sept. 7-9th.
5	D. O'Brien, Ballinamere, Tullamore, Offaly	Medium Loam Sub-Soil Lime-st.	1934 Oats 1935 Turnips	April 8th	Aug. 26-29th
6	M. P. Minch, Rockfield, Athy, Co. Kildare	Deep Loam Sub-Soil Gravel	1934 Barley 1935 Beet	March 16th	Aug. 12-16th.
7	Mrs. Segrave, Dunany, Dunleer, Co. Louth	Heavy Loam Sub-Soil Gravel	1934 Wheat 1935 Turnips	April 6th	Sept. 7-12th.
8	M. Howlett, Ramsgrange, Co. Wexford	Stiff Loam Sub-Soil Shale	1934 Wheat 1935 Roots	April 3rd	Aug. 29- Sept. 3rd.
9	P. Byrne, Ballygrangans, Co. Wexford	Sandy Loam Sub-Soil Gravel	1934 Barley 1935 Potatoes	April 17th	Aug. 25th.
10	D. Morris, Tomahurra, Enniscorthy	Sbaly Loam Sub-Soil Shale	1934 Oats 1935 Turnips	April 10th	Aug. 27-29th.

TABLE II.

Large Scale Barley Variety Experiments, 1936.

Yield and Value of Grain per Statute Acre.

Centre.	Spratt-Archer 37 No. 3.										Golden Archer										Abel Rex x S. -A. 6/3/2									
	Yield of		Value per		Total value including						Yield of		Value per		Total value including						Yield of		Value per		Total value including					
	Dressed Grain		Screenings		Screenings						Dressed Grain		Screenings		Screenings						Dressed Grain		Screenings		Screenings					
	Brs. St.	St.	s.	d.	£	s.	d.	£	s.	d.	Brs. St.	St.	s.	d.	£	s.	d.	£	s.	d.	Brs. St.	St.	s.	d.	£	s.	d.	£	s.	d.
CORK.																														
J. Tait ...	11	12	5		16	8	12	8	4		13	9	5½		16	7	11	5	5		12	14	8		16	5		11	11	0
TIPPERARY																														
M. Carroll ...	13	2	14½		16	3	11	0	6		11	11	0		13	4	0	15	5		12	5	10½		16	1		10	2	2
KILKENNY																														
J. Bryan ...	9	6	16		16	2½	7	10	11½		8	12	14½		16	2	7	8	8½		8	1	16		16	1		6	17	8
OFFALY.																														
Wm. Watkins ...	16	1	5		16	4	8	6	10		9	2	4		16	3	7	10	3		9	18	4		16	5		8	3	1
D. O'Brien ...	11	0	2½		16	0	8	17	3		11	11	2		16	1	9	9	0		9	15	2		16	0½		8	0	5
KILDARE																														
M. P. Minch ...	14	4	8		16	1	11	13	2		13	7	7½		16	4	11	3	3		11	7	6½		16	4		9	10	1
LOUTH																														
Mrs. Segrave ...	13	14	8		16	2½	11	8	10½		12	11	6		16	3	16	0	2		13	7	4½		16	4		11	1	9
WEXFORD																														
M. Howlett ...	10	15	9		16	4	9	3	2		10	5	13		16	2½	8	13	8		9	10	8		16	3½		8	0	9½
P. Byrne ...	6	15	2½		15	11½	5	11	11½		6	14	2½		16	4	5	13	6½		6	13	4		16	3½		5	13	0
D. Morris ...	12	15	8		16	6	10	17	6		13	5	2½		16	7	11	2	0		12	2	2½		16	4		9	10	3½
Total ...	117	4	78½				97	7	6½		111	7	66½				92	10	5		107	7	66					89	1	1
Average ...	11	12	7½				9	14	9		11	2	6½				9	5	0½		10	11	6½					8	18	1

*Screenings valued at 6d. per stone

TABLE III.

Large Scale Barley Variety Experiments, 1936.

Analysis of Produce.

Grower	Spratt-Archer 37 No. 3.				Golden Archer				Abel Rex x S.-A. 6/3/2			
	Bushel Wt.	Moisture	On dry matter		Bushel Wt.	Moisture	On dry matter		Bushel Wt.	Moisture	On dry matter	
			Wt. of 1000 corns	Nitrogen %			Wt. of 1000 corns	Nitrogen %			Wt. of 1000 corns	Nitrogen %
J. Tait ...	53.6	20.0	37.2	1.30	54.2	19.2	38.3	1.39	53.9	19.6	38.1	1.41
M. Carroll	52.0	21.3	37.2	1.64	54.0	21.4	39.7	1.63	54.0	21.8	41.3	1.67
J. Bryan	52.5	18.7	35.2	1.37	53.2	18.7	35.2	1.47	53.3	18.8	39.9	1.48
Wm. Watkins	52.0	18.5	33.6	1.52	52.2	19.0	35.4	1.57	53.3	19.1	34.0	1.60
D. O'Brien	49.3	22.4	34.1	1.47	50.7	21.2	36.4	1.60	52.2	20.1	36.5	1.66
M. P. Minch	51.3	21.3	37.1	1.43	52.3	20.3	38.3	1.59	52.3	19.9	38.2	1.53
Mrs. Segrave	53.9	18.6	36.4	1.77	55.3	18.3	38.6	1.80	55.3	19.0	40.0	1.80
M. Howlett	50.6	21.5	33.2	1.40	51.0	20.3	34.7	1.53	52.2	20.7	35.2	1.52
P. Byrne	51.3	20.6	39.2	1.36	53.2	18.6	33.0	1.41	53.5	19.7	33.1	1.44
D. Morris	51.5	19.6	36.0	1.36	52.3	19.3	38.1	1.40	52.4	19.5	37.9	1.46
Average	51.8	20.3	34.9	1.46	52.8	19.9	37.1	1.55	53.3	19.9	37.2	1.56

HALF DRILL STRIP EXPERIMENTS.

Two of these experiments were carried out on the farm of Messrs. J. H. Bennett, Ltd. They consisted of a series of strips of each variety, each strip being half the width of the sowing machine. There were twenty-two such strips of each variety.

No. 1 experiment was a continuation of the investigations which have been made for a number of seasons into the variation of the produce from the individual grains off a single ear. In this case the standard Spratt-Archer 37 No. 3, was tried against a bulk sample comprised of the seven best strains in the Dr. H. Series.

During the growing period no difference could at any time be observed. The results are set out in Table IV, where it will be seen that in the twenty-two comparisons the Dr. H. series gave the heavier yield sixteen times, on three occasions the yields were equal and on three occasions the standard gave the higher yield, but on two of these only by a very small amount. On the whole, the bulk of the Dr. H. series gave a significantly higher yield. In the analysis, the nitrogen content is practically the same for both, but the malting value of the standard is higher, though not sufficiently so to balance the difference in yield.

TABLE IV.
Half Drill Strip Experiments, 1936.

No. 1. Experiment.				No. 2 Experiment.			
S.A. 37. No. 3.		S.A. 37. Dr. H.		Field Plot.		2nd. Pedigree.	
	sts. lbs.		sts. lbs.		sts. lbs.		sts. lbs.
a.	2 11	B.	2 11	a.	3 0	B.	2 12½
C.	2 4	b.	2 9½	C.	2 8	b.	2 12
c.	2 5½	D.	2 11	c.	2 7	D.	2 12
E.	2 9	d.	2 11½	E.	2 8	d.	2 12
e.	2 13½	F.	2 13	e.	2 12	F.	2 11
G.	3 0	f.	2 13½	G.	2 8	f.	3 0
g.	3 5	H.	3 5	g.	2 8	H.	2 9½
I.	3 5	h.	3 8	I.	2 10	h.	3 1½
i.	3 2	J.	3 3	i.	3 0	J.	3 0
K.	3 1	j.	3 4	K.	2 13	j.	3 2
k.	3 0½	L.	3 3	k.	2 13	L.	3 2
M.	3 0½	l.	3 2	M.	2 13	l.	3 4
m.	3 4½	N.	3 10	m.	3 1½	N.	3 4½
P.	3 5	n.	3 8	P.	2 13½	n.	3 1½
p.	3 5	Q.	3 5	p.	3 4	Q.	3 4
R.	3 0	q.	3 7	R.	3 1	q.	3 1½
r.	3 3	S.	3 6	r.	3 1	S.	3 0½
T.	3 2	s.	3 6	T.	2 9½	s.	2 13½
t.	3 3½	V.	3 8½	t.	2 7½	V.	2 10½
W.	3 8	v.	3 8½	W.	2 5½	v.	2 12
w.	3 9½	X.	3 2½	w.	2 5	X.	2 12½
Y.	2 13½	x.	3 5	Y.	2 8	x.	2 12½
Total	68 0		71 7		61 2½		65 11½
Average Weight	3 1.2		3 3.5		2 11		2 13.9
Average Moisture %	18.9		19.3		17.5		18.2
Average Nitrogen %	1.17		1.16		1.21		1.23
Average Wt. of 1,000 corns	36.6 grms.		36.6 grms.		35.9 grms.		35.5 grms.
Relative Malting Quality	100.0		99.1		100.0		99.0

No. 2 experiment was with two generations of Spratt-Archer 37 No. 3. The object of this experiment was to observe whether any degeneration was taking place in this standard variety.

The results are also set out in Table IV. It will be seen that the Second pedigree gave a higher yield on seventeen occasions, twice the weights were equal and three times the Field plot yielded the heavier, but only by a very slight amount each time. The difference in yield is significant and may indicate a falling off in the high yielding character.

The nitrogen content is practically the same in both cases and the malting quality of the Field plot is superior to that of the second pedigree, but this is not sufficient to balance the difference in yield.

SMALL SCALE QUANTITATIVE EXPERIMENTS.

There were two of these experiments. The one conducted in the cage comprised seven new two-rowed varieties with Spratt-Archer 37 No. 3 as standard. The second experiment was conducted outside the cage and comprised eight six-rowed varieties, July six-rowed being regarded as the standard.

Both experiments were set out in the usual way, i.e., in three blocks with 40 squares in each block. There were fifteen replications of each variety and the figures given in Table V are the mean of the fifteen replications. The order of the varieties in the Table is that of the grain weight.

In No. 1 experiment, Spratt-Archer 37/6, No. 7 is a new selection from the old strain. It appears to be of great promise, in that its yield is significantly higher than that of the other varieties included in the experiment. Its malting quality also is superior to that of the standard, but only by a very slight degree. No. 9 of the Dr. H. series was inferior to all varieties except one as regards yield, but its malting quality was the highest of the experiment.

All the six-rowed crosses were of low malting quality.

Student 2/1 gave a low yield, but its malting quality was relatively good.

In No. 2 experiment the outstanding variety was Beaven's 49/14/3, and throughout the growing season it was a nice even plot, with good strong straw. It produced on the average the highest weight of ears and a significantly high weight of grain. Its nitrogen content was fairly low and its malting quality relatively high.

July six-rowed demonstrated its high malting quality in comparison with the other varieties in the experiment though its yield is relatively low. B.244 is, perhaps, a heavier yielding barley than would appear from this experiment, because on account of its lateness in ripening it had to be left standing for some time after the other plots were harvested, with the result that it suffered considerable damage. It is a very strong strawed variety, but not suitable for late districts. All the varieties in this experiment were six-rowed, a type not favoured by Maltsters in this country.

Continuing the investigations which have been conducted for a number of years on the produce of the individual grains from a single ear of barley, further trials were made on the produce of grains from different parts of the ear. In this connection three small plots were sown with grains taken from the top, middle and bottom sections of ears of Spratt-Archer 37 No. 3.

The produce of these plots is being held over for further propagation in 1937, in order to provide sufficient bulk for malting tests.

TABLE V.

Ballinacurra, 1936. Small Scale Quantitative Experiments.
Average of Fifteen Replications.

Variety No. 1.	No of Plants	No. of Ears	Weight of Ears Grammes	Weight of Straw Grammes	Weight of Grain Grammes	Co-efficient of Migration %	Relative Malting Quality S—A. 37 No. 3=100	Nitrogen %	Weight 1,000 corns Grms.
Spratt-Archer 37/4 No. 7 (ex. Hunter)	95	162	200.54	366.40	153.07	26.9	100.1	1.45	40.8
Spratt-Archer 37, No. 4 x July 6 rowed 16.2	94	151	190.16	453.02	140.72	21.8	94.5	1.43	40.0
Spratt-Archer 37 No. 3 D.S.K. Binder x July 6 rowed 1.2	95	163	196.01	412.22	140.52	23.1	100.0	1.38	38.9
Spratt-Archer 37 No. 3 x July 6 rowed 2.	93	176	175.40	320.61	138.14	27.8	94.7	1.66	41.2
D.S.K. Binder x July 6 rowed 4.	94	177	174.51	319.14	138.01	27.9	94.1	1.64	40.8
Spratt-Archer 37 No. 3 Dr. H. 9.	93	180	170.02	329.33	132.98	26.6	93.9	1.72	39.7
Student 2/1.	94	155	185.62	356.66	132.62	23.1	100.6	1.48	38.5
	90	139	165.39	335.63	121.69	22.0	100.2	1.55	40.6
No. 2.							Beaven's 49/14/3=100		
Beaven's 49/14/3	102	195	313.25	422.12	265.39	36.0	100.0	1.56	37.2
Beaven's F.112.	102	142	281.56	463.61	233.36	31.3	71.2	1.61	41.4
B.244.	102	172	282.76	656.67	225.93	24.0	82.6	1.63	33.7
Beaven's 50.9/1.	100	156	268.47	618.28	225.81	25.4	76.3	1.49	37.3
July 6 rowed	99	163	269.80	337.02	225.19	37.1	104.0	1.43	31.0
Beaven's 49/2 3.	98	147	227.00	366.67	137.15	31.5	101.6	1.45	39.2
Spratt-Archer 37 No. 3 x July 6 rowed 22.	100	204	309.43	582.00	173.20	19.9	100.2	1.69	34.2
Donegal 6 rowed	90	153	240.81	396.58	175.23	27.4	99.7	1.83	34.9

RIPENING EXPERIMENT.

Last season (1935), a departure from normality was observed in some hybrids as regards the relationship of barley and malt analysis and this was thought to be due to premature death of the plant owing to drought.

An experiment was carried out this year in which a portion of a plot was covered over to keep the ground dry, and in another portion of the plot the plants were all loosened in the ground when they came into ear, in order to check growth. The crop on each portion of the plot was harvested when ripe. In addition, certain lines of corn were cut out at varying periods subsequent to earing. The grain was subjected to analysis and the results are set out in Table VI.

These figures are interesting from the point of view of the changes preceding ripeness, but they do not explain the abnormality of the previous season.

TABLE VI.

			Weight of 1,000 corns	Nitrogen % of Barley	Relative Malting Quality	Soluble Nitrogen
3 weeks before ripening	..	..	17.3	1.35	Not malted	—
2 weeks before ripening	..	..	27.2	1.20	99.5	.74
1 week before ripening	..	..	37.9	1.18	98.9	.70
2 days before ripening	..	..	38.0	1.13	100.0	.72
Plot covered over	..	..	38.0	1.25	99.6	.28
Plants loosened in ground	..	..	35.9	1.27	99.3	.75

OATS.

PURE LINE.

A single plant selection and a garden plot of Black Tartary Oats were grown at the Cereal Station, Ballinacurra, in order to retain a nucleus of this variety.

DEPARTMENT'S EXTENSION PLOTS.

In order to provide supplies of pedigree seed oats for seed merchants and others interested in the distribution of seed oats, stocks of Victory II and Glasnevin Success III were grown under agreement with selected farmers in the neighbourhood of Ballinacurra. These stocks were grown, harvested and threshed under the Department's supervision. The produce, amounting to 612 barrels, was dried and cleaned, and will be available for distribution in the spring of 1937.

The following are the names of the growers of these stocks, together with the acreage and the amount of seed sown.

VICTORY II.

		Acres	Brls.	Sts.
John Tait, Hermitage, Rostellan, Co. Cork	..	10	11	6
Patk. O'Keefe, Ardra, Rostellan, Co. Cork	..	4	4	8
Thos. Twomey, Ballintubber, Carrigtwohill, Co. Cork		7	8	0
Jonas J. Smyth, Violet Hill, Cloyne, Co. Cork	..	9	10	4
Michael Kelleher, Geragh, Ballinacurra, Co. Cork	..	6	6	12
Total		36	14	2

GLASNEVIN SUCCESS III.

		Acres	Brls.	Sts.
*Wm. Tait, Buckstown, Rostellan, Co. Cork	..	7	8	0
*John Hegarty, Ballinbeg, Rostellan, Co. Cork	..	4	4	8
Wm. Leahy, Carrigagower, Ballinacurra, Co. Cork.		9	10	4
John Reilly, Ballinabointra, Carrigtwohill	..	3½	4	0
Total ..		23½	26	12

*The seed sown at these centres was obtained from the Albert Agricultural College, Glasnevin, Dublin.

SCHEME FOR THE DISTRIBUTION OF PEDIGREE STOCKS OF SEED OATS.

Continuing the scheme inaugurated in 1933, nucleus stocks of pedigree Victory II and Glasnevin Success III, which were raised at Ballinacurra in 1935, were distributed to Seed Merchants and others in the spring of 1936.

These pedigree stocks of seed were supplied by the Department to merchants on condition that the latter would undertake to have the seed sown by reliable farmers and that they would agree to purchase the produce where suitable and retain it for seed purposes. In order to facilitate merchants, the Department arranged for the inspection by Agricultural Instructors of the growing crops. Reports received at the end of the season of 1936 indicated that in practically all cases the crops grown from pedigree seed supplied to merchants were passed as likely to be suitable for the production of seed. Consequently, it is anticipated that there should be considerable supplies of good quality home grown seed available for sowing in 1937. It is also hoped that it will be possible in each succeeding year to allocate "Foundation" stocks of pure line seed of suitable varieties to reliable firms who will be prepared to propagate them in accordance with the terms of the scheme. In this connection stocks were supplied to the following in 1936 :—

VICTORY II.

Superintendent, Agricultural School, Clonakilty, Co. Cork.
 Superintendent, Agricultural School, Athenry, Co. Galway.
 Superintendent, Agricultural School, Ballyhaise, Co. Cavan.
 Wm. Duggan, Carrick-on-Suir, Co. Tipperary.
 T. Wade, Straffan, Co. Kildare.
 J. Morgan, Drinagh, Drimoleague, Co. Cork.
 R. J. Smith and Sons, Main Street, Lifford, Co. Donegal.
 R. Acton and Sons, Kinsale, Co. Cork.
 W. J. O'Keefe, Faythe Maltings, Wexford.
 D. J. Bergin, 29-30 Smithfield, Dublin.
 T. Hill, Clonakilty, Co. Cork.
 G. Byrne, Bree, Ballyhogue, Enniscorthy, Co. Wexford.
 J. Callaghan and Sons, Glanworth, Co. Cork.
 Haskins Bros., Wicklow.
 Shelburne Co-Op. Agr. Society, Campile, Co. Wexford.
 Suttons, Ltd., South Mall, Cork.
 D. E. Williams, Tullamore, Offaly.
 W. Drummond and Sons, Dawson Street, Dublin.
 W. Drummond and Sons, Drogheda, Co. Louth.
 John H. Bennett, Ltd., Ballinacurra, Co. Cork.
 McKenzies, Ltd., Camden Quay, Cork.
 M. Rowan, 51-52 Capel Street, Dublin.
 J. Atkins and Co., Ltd., South Mall, Cork.
 Hugh O'Donnell, Porthall, Co. Donegal.

GLASNEVIN SUCCESS III.

Superintendent, Agricultural School, Clonakilty, Co. Cork.
 Superintendent, Agricultural School, Ballyhaise, Co. Cavan.
 William Duggan, Carrick-on-Suir, Co. Tipperary.
 W. J. O'Keefe, Faythe Buildings, Co. Wexford.
 D. J. Bergin, 29-30 Smithfield, Dublin.
 D. Kenny, Wilkinstown, Co. Meath.
 T. McKenzie and Sons, Ltd., Dublin.
 T. Hill, Clonakilty, Co. Cork.
 Shelburne Co-Op. Agr. Society, Campile, Co. Wexford.
 D. E. Williams, Tullamore, Offaly.
 Wm. Drummond and Sons, Dawson Street, Dublin.
 Suttons, Ltd., South Mall, Cork.
 John H. Bennett, Ltd., Ballinacurra, Co. Cork.
 M. Rowan and Co., 51-52 Capel Street, Dublin.
 J. Atkins and Co., Ltd., 54 South Mall, Cork.
 Loc Garmain Co-Op. Agr. Society, Ltd., Wexford.
 E. Dowley, Ballinvoher, Waterford.
 P. Whelan, Raheen, Baltinglass.

The Albert Agricultural College co-operated with the Department in the working of the foregoing scheme and distributed stocks as follows :—

GLASNEVIN SONAS.

Mr. Quinlan, Bridge House, Knockaney, Bruff, Co. Limerick.
 Mr. Fingleton, Portnahinch, Portarlinton, Laoighis.
 Manager, Chantilly Stud Farm, Shankill, Co. Dublin.
 R. Craigie, Harristown, St. Margaret's, Co. Dublin.
 B. G. Ussher, Cappagh House, Cappagh, Co. Waterford.
 M. Byrne, Nash, New Ross, Co. Wexford.

ARDRI.

J. Dillon, T.D., Ballaghaderreen, Co. Mayo.
 A. D. Place, Rosemount, New Ross, Co. Wexford.
 P. Malone, Cloneyegan, Mount Temple, Moate, Co. Westmeath.
 M. Drew, Donacarney, Drogheda, Co. Meath.
 Thos. Doran, Killeek, St. Margaret's, Co. Dublin.

SONAS MARVELLOUS.

Patrick J. Cooney, Carpenterstown, Castlepollard, Co. Westmeath.
 Senator J. Westropp Bennett, Summerville, Kilmallock, Co. Limerick.
 S. P. Little, Borris Lodge, Borris, Co. Carlow.
 R. C. Barton, Glendalough House, Annamoe, Co. Wicklow.
 Manager, Chantilly Stud Farm, Shankill Co. Dublin.

POTATO No. 1.

Patrick J. Cooney, Carpenterstown, Castlepollard, Co. Westmeath.

P. Maye, Rathglass, Corbally, Co. Sligo.

Agricultural School, Athenry, Co. Galway.

A. E. McCorkell, Carrowen, Speenogue, Co. Donegal.

Wm. Buchanan, Bridgetown Farm, Bohillion, Speenogue, Co. Donegal.

David Rankin, Classygowan, St. Johnston, Co. Donegal.

Francis McClean, Dromore, Letterkenny, Co. Donegal.

D. Diver, Letterkenny, Co. Donegal.

Hugh O'Donnell, Porthall, Co. Donegal.

J. McGill, Magheragh, Castlefin, Co. Donegal.

C. Gallan, Broomfield, Castlefin, Co. Donegal.

J. H. Cooper, Dungormon, Castlefin, Co. Donegal.

P. Kelly, Ballyarl, Killygordan, Co. Donegal.

THE HERRING FISHERIES OFF THE NORTH COAST OF DONEGAL.

By G. P. FARRAN, B.A., Inspector of Fisheries.

The herring fishery which takes place every spring and early summer off the north coast of Donegal is one of the most regular and uniform on the coast of Ireland, and, as it has been under close observation from a scientific point of view since 1921, a short account of it will serve to illustrate the aims of modern methods of research and the extent to which these methods can lead to results of practical value.

The fishing grounds are from ten to forty miles from shore and are, consequently, out of the reach of small sailing and rowing boats, except in the neighbourhood of Tory Island. The fish are taken, almost exclusively, to the westward of a line from Malin Head to Skerryvore, in Argyll. This line marks, with slight variations from year to year, the approximate eastern limit of the strongly saline oceanic water which comes in from the Atlantic. This Atlantic water, with a salinity of 35 parts per 1,000 (technically described as $S^{\circ}/_{\infty}$ 35.00) is, in this region, sharply marked off from the fresher water derived from the Clyde and Irish Sea, and it is a reasonable inference that these particular herrings avoid any great changes in salinity. One reason for this preference may be that the Atlantic waters, where they border on the coast, are very rich in the plankton, mainly minute crustacea, on which the herrings feed greedily after spawning, while the fresher, less saline water is, in this neighbourhood, relatively poor in plankton.

The fishing throughout the year falls into three well-marked periods, illustrated in the diagram (Fig. 1), which shows the total catch for each calendar month for the years 1921-1935. The winter or early spring fishing starts in January or at the end of December and lasts during January and February. At this time the fish are shoaling for the purpose of spawning and are full of milt and roe, and some fish actually spawning may be taken as early as January. In March most of the fish are spent and out of condition, and the fishing is suspended till the end of April. During April herring food is scarce, but, with the lengthening days and increasing temperature of the water towards the end of the month, there is a sudden development of small crustacea, and in a few weeks the spent fish, feeding voraciously, rapidly regain condition and become thick and fat. In May the main fishing starts and lasts for a couple of months, till the fish disappear from the grounds.

The next stage in the history of the fishery was unknown till a few years ago, when the French scientist, Monsieur J. Le Gall, took up the study of the herrings which the French steam trawlers were catching at the edge of the deep water about 40 miles N.N.W. of Co. Donegal on the grounds known to fishermen as "Klondyke", and noticed that the time of the appearance

of the fish on the trawling grounds corresponded with that of their disappearance from the area worked by the drift net fishermen. The trawled herrings agreed closely with the Donegal fish in size, age and state of maturity, and his conclusion that they are the same body of fish may be taken as correct.

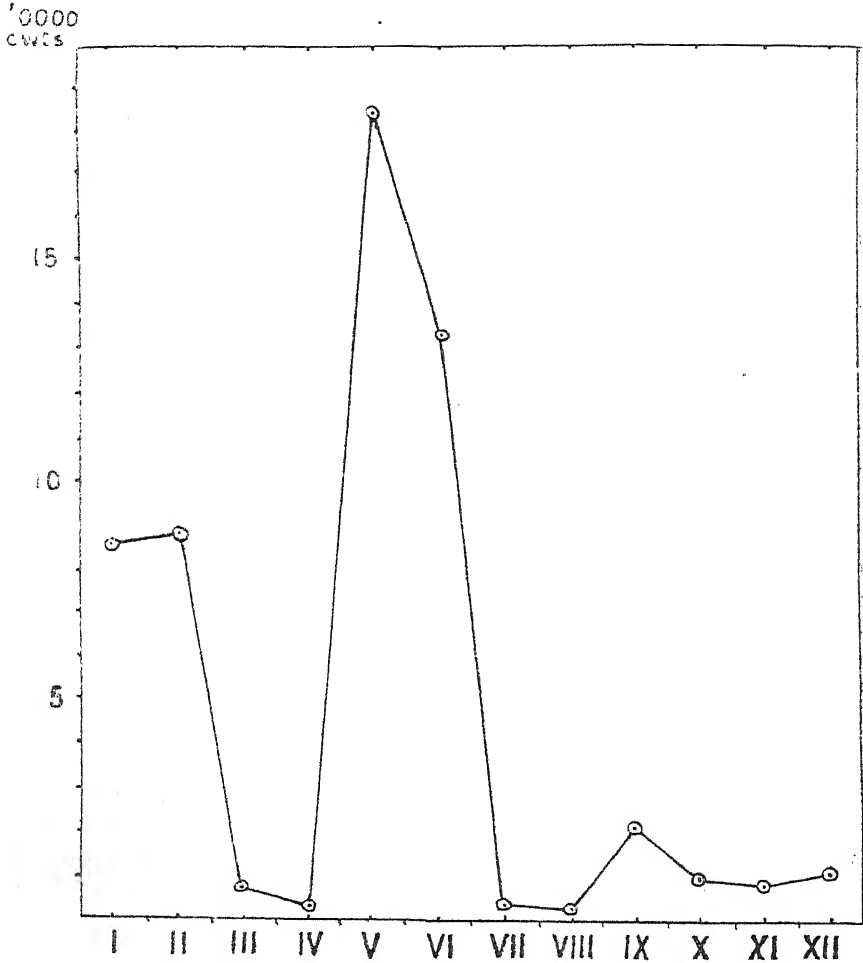


FIG. 1.

Totals of the catches in each calendar month during the period 1921-1935.]

The herrings remain on the trawling grounds, keeping at the bottom in about 80 fathoms, from the end of June to October or exceptionally to November, and then, as their gonads are ripening, make their way towards shore, appearing again on the coast at the end of December.

The small autumn fishery shown on the diagram (Fig. 1) takes place in September and October not far from shore, and is carried on by numerous small local boats which cannot go far to sea. This fishery appears to have

no place in the cycle referred to above. The fish differ in condition and in age composition. They spawn in autumn instead of in spring, and their periods of abundance or scarcity are quite independent of those of the spring and summer caught fish. Their history is still rather obscure and needs further observation before it can be cleared up.

Practically all present knowledge of the life history of the herring is based on the fact that it is possible readily to tell the age of any herring by an examination of its scales. In each successive winter, after the scales have formed on the young fish, a more or less clearly indicated ring or mark is formed round the margin of the scale by the temporary interruption of growth, and as the scale increases in size with the subsequent growth of the fish, these rings are left as permanent records of its past life. The rings can be plainly seen in the illustration (Fig. 2) which shows two herring scales, one with three and the other with eight rings, the outermost ring in each case coinciding with the margin of the scales, the fish being respectively three and nine years old. The distance from the centre of the scale to the edge of each ring, measured in the middle line, is an indication of the length which the fish has reached at the end of each year, since the growth of the scale and the fish is proportionate. From this we can get further information and can tell in which years growth has been rapid and in which years slow.

Practically every shoal of mature herrings is made up of a mixture of fish of different ages, and, as a rule, the proportionate numbers of fish of each age are uniform throughout a fishery at any one time. The Donegal herrings are very suitable for age investigations of this kind, as the stock remains almost unchanged during the course of the spring and summer fishery each year and returns again the next year with little alteration other than that due to reduction by normal mortality and capture and to the addition of younger fish.

The Department is fortunate in having available a continuous record of the sizes and age composition of the spring and summer Donegal herrings since 1921. This is mainly due to the kindness of Mr. B. Storrow, of the Dove Marine Laboratory, Cullercoats, who has been good enough to examine each year a number of samples which have been sent to him by the Department, and to supply a detailed record of their age, size and maturity, and rate of growth as deduced from measurements of their scales.

The diagram (Fig. 3), based mainly on Mr. Storrow's records but supplemented by the examination of samples by the Department's own staff, shows the average age composition of the stock of herrings each year from 1921 to the present time. It may be seen from it that the young herrings join the spawning shoals at three years, or exceptionally at two years old, and that fresh recruits of four years old, and possibly some of five years old, may arrive later. Meanwhile the stock at all ages is being reduced each year both by fishing and by natural wastage until the chance of survival of a herring of over twelve years old is practically nil. The numbers of three-year-old herrings which join the shoals each year vary widely from year to year. Sometimes, as in 1927, the new arrivals may

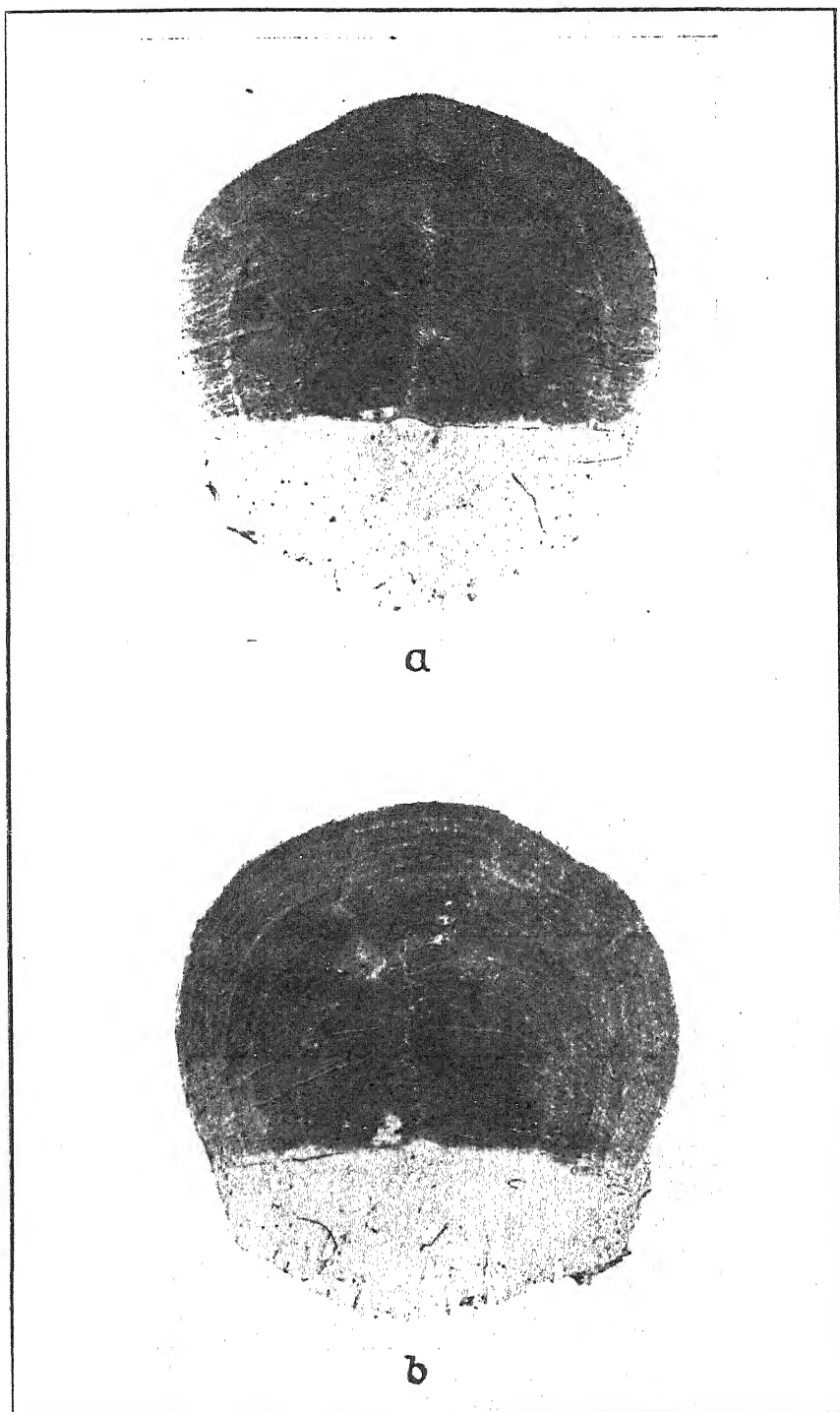


FIG. 2.

Herring scales showing (a) three winter rings, magnified 11 times; (b) eight winter rings, magnified 8 times. The outermost ring coincides in each case with the margin of the scale

outnumber the stock already present; in other years the addition to the stock may be insignificant. This affords an explanation of the periodic fluctuations in the fishing; for a rich and abundant year class, as it is called,

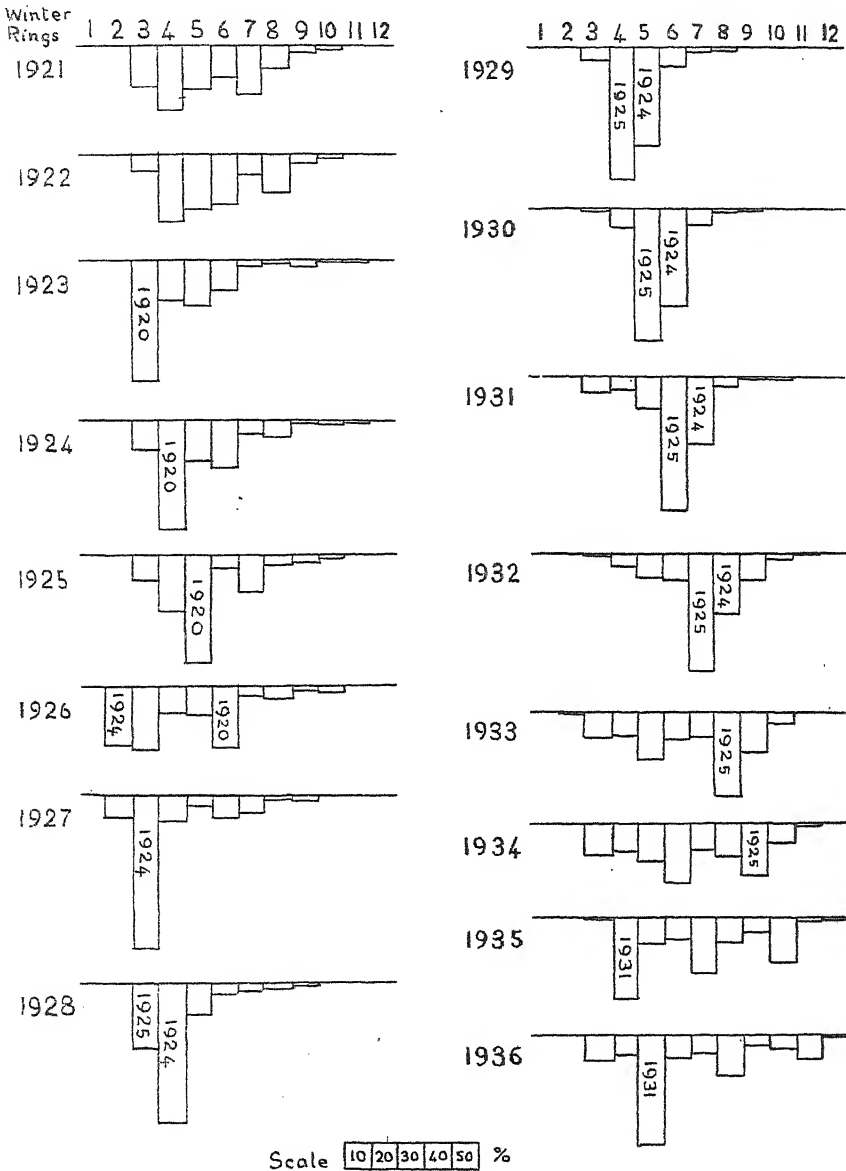


FIG. 3.

Diagram showing the percentage of fish with successive numbers of winter rings in the samples of each year from 1921 to 1936. The columns representing the larger year classes are marked with the year in which they were hatched.

the result of an unusually successful hatch of young herrings in conditions favourable to their survival, will so increase the stock that the fish hatched in a single year may be the mainstay of the fishing for many subsequent

years. On the other hand, a series of years with poor facilities for the survival of the young brood may allow the stock to fall so low that the catch will scarcely repay the labour of fishing.

On the diagram can be traced the reappearance, year after year, of each successive year class, the plentiful and the scarce years each retaining their characters throughout the time they appear on the fishing grounds. It will be seen that outstanding year classes were those of 1920, 1924 and 1925. The year class 1931 at first sight appears to have been a good one, but that is only in comparison with a succession of poor broods, for it must be kept in mind that the diagram only represents the percentage of each year class in the samples of the year, and not the actual amounts, and that a moderate year class occurring in a series of poor ones would have the same appearance as a very good one amongst a number of moderate ones.

To give a clearer idea of the great differences between good and bad years and year classes it may be pointed out that normally, *i.e.*, on an average over our sixteen years' observations, the herrings with four and five winter rings together amount to 46 per cent. of the annual stock. In the year 1929 these two ages, the year classes hatched in the productive years of 1924 and 1925, amounted to 85 per cent. of the total. Now the increase of the percentage for these two year classes from 46 to 85, while the remainder of the stock was at its normal figure, would indicate an increase of the quantity from these two years by about seven times, and not, as some might at first imagine, a doubling of it, and this would mean that the whole stock present in the year 1929 was nearly four times above the normal. There is nothing in the other facts known about the fishing for that year to make us doubt this conclusion.

If we now take the percentage distributions of ages for our sixteen years of observations and add together the percentages of the three-year-olds, four-year-olds, and so on, we can get a first approximation to the average share the fish of each age take in making up the total catch, and also the rise and fall in each year class during the years that it is present on the fishing grounds. The figures we arrive at by doing so are :—

2	3	4	5	6	7	8	9	10	11	12	winter rings
2.0	15.3	20.0	20.4	15.7	11.2	8.5	4.3	2.3	.8	.2	per cent.

From these figures it can be seen that the four-year-olds are rather more numerous than the three-year-olds; there is practically no change from four to five years old, but after this there is a rapid and increasing falling off till the numbers at twelve years old are barely one hundredth of those at four years old.

These figures, as has been said, are only approximate, owing to the short period of observation and the very wide variations from year to year in the stock, but we can make use of them to calculate the approximate size of the different year classes in the stock of each year, and by making allowances for the irregularities introduced by the variations in sizes of the year classes we are able, by a simple calculation—which would take too much space to

set out at length—to draw up a table showing the changes which a single year class undergoes during its presence on the fishing grounds.

If we omit the two-year-olds, whose appearances on the grounds are very irregular, and call the stock at three years old 100, we find that:—

100 at 3 years old are represented by 149 at 4 years old.							
149	„	4	„	129	„	5	„
129	„	5	„	95.5	„	6	„
95.5	„	6	„	60.6	„	7	„
60.6	„	7	„	36.4	„	8	„
36.4	„	8	„	19.1	„	9	„
19.1	„	9	„	7.7	„	10	„
7.7	„	10	„	2.5	„	11	„
2.5	„	11	„	.6	„	12	„

We have now arrived at a position in which we may attempt to make some practical use of these figures. By taking a sufficient number of samples during the fishing season, not necessarily very many, a fairly accurate estimate of the ages of the fish on the grounds can be made, and as it is known what the increase or decrease of each age is likely to be, it should be possible, at the end of the fishing season, to predict with reasonable accuracy what proportion of these fish will return next year, and, consequently, whether the next year's fishing is likely to be better or worse. One point is still uncertain: we cannot tell how many new recruits at three years old will join the shoals, and, until some way has been devised of tracking down and sampling the one and two year old fish, this point must remain obscure.

It is interesting to compare the rate of change of the Donegal stock of herrings with those of other localities. This rate has been worked out for the herrings of the Southern North Sea, the Lowestoft and Yarmouth fishery, by Mr. Hodgson, of the Ministry of Agriculture and Fisheries. There it is found that a much smaller proportion of the stock—barely nine per cent.—are three-year-olds. Most of the new recruits first come in at four years old, and there is a higher death rate, increasing with age, which leaves practically no fish surviving beyond ten years old.

In Norway it is found that the fish do not join the spawning shoals till they are four or five years old, and the death rate is much smaller and more uniform, so that fish of twenty or more years old are not uncommon.

In Figure 4 is shown the estimated relative size, in Donegal waters, of each year class, or herrings hatched in each year, from 1916 to 1931, the quantities being arrived at by adding together the estimated values of their successive reappearances each year. The outstanding richness of the two year classes 1924 and 1925, already referred to, is at once apparent. As the 1932 and 1933 year classes have, naturally, only appeared twice and once respectively, it is too soon to make a definite estimate of their size, and they have been omitted from the figure, but it can be said that they are amongst the worst of which we have records.

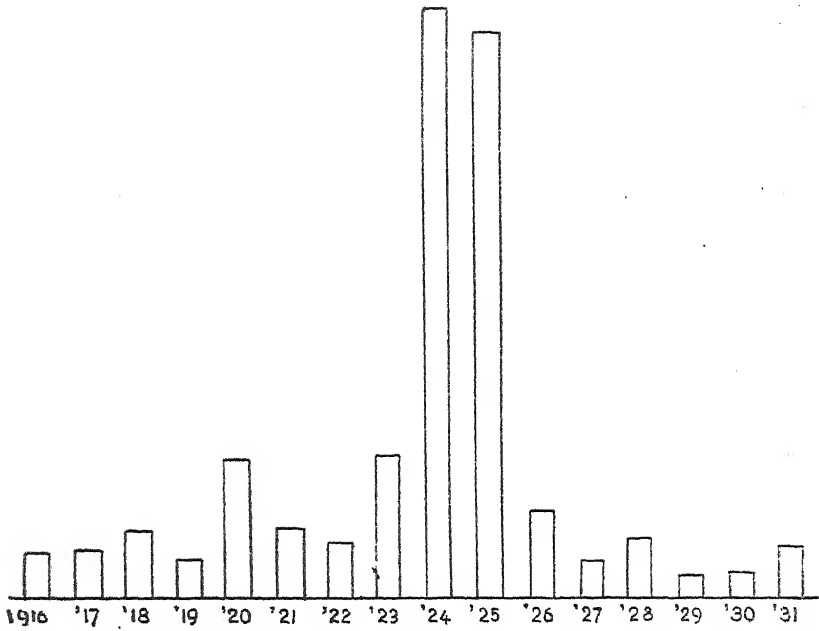


FIG. 4.

The height of each column represents the estimated relative size of the year classes hatched in each year from 1916 to 1931.

Figure 5 shows as a graph the estimated size of the stock on the North Donegal grounds each year from 1921 to 1935, and, in the same figure, the broken line represents the total catch as shown by the statistics of the winter and summer fisheries on the same grounds. It will be seen that the

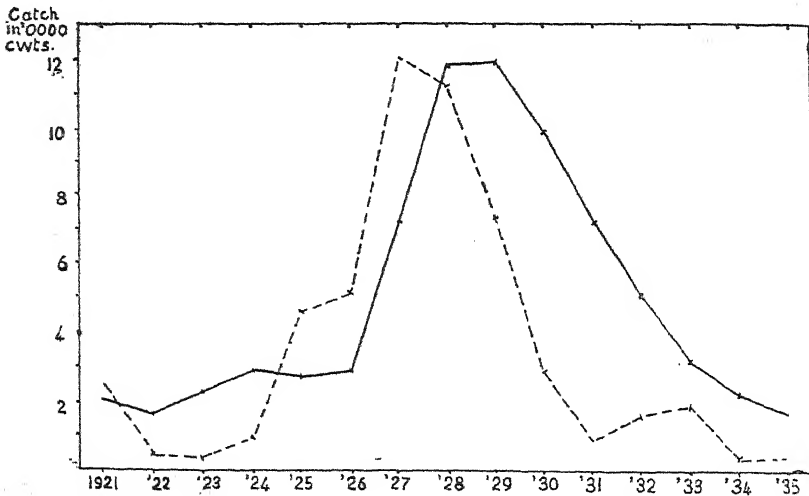


FIG. 5.

The broken line shows the total catch, in 10,000 cwts., in the winter and summer fishing 1921-1935. The unbroken line shows the estimated relative proportions of the stock in the same period.

heavy landings of 1927-29 coincided with the increase in the stock. The falling off in the landings in 1930, when by calculation the stock should still have been adequate, is difficult to account for. The season in that year opened well with abundant signs of fish, but later, in June, when the fish were getting into prime condition, the herrings disappeared. The opinion of the fishermen, which in general is the fruit of long experience, was that the shoals had moved off to sea and could not be located.

It is not to be expected that the actual landings will give more than a very imperfect indication of the quantity of fish on the fishing grounds, as they depend on the number of boats fishing and the number of days that they fished, and these numbers are governed by considerations which often have no relation to the stock of fish. If the fish are scarce the fishing will be abandoned, and if they are very plentiful more boats will be attracted by the prospect of good catches, and in these cases the statistics of landings will give an exaggerated picture of the fluctuations; but the state of the markets, the facilities for landing and curing, the existence of alternative fishing elsewhere and, above all, the weather, will often outweigh other considerations.

When our records of age and growth rate, as deduced from the scales, are further examined in detail, some interesting facts are brought to light. It will be seen from Figure 3 that the occurrence of small numbers of two-year-old fish in the commercial catches, as sampled, may be a preliminary to the arrival of three-year-old fish in considerable numbers the next year. These two-year-olds, as their scale measurements show, are always fish which have grown rapidly during their first and second years, and are noticeably larger than the fish of the same year class which first arrived as three-year-olds would have been at the same age. They are evidently

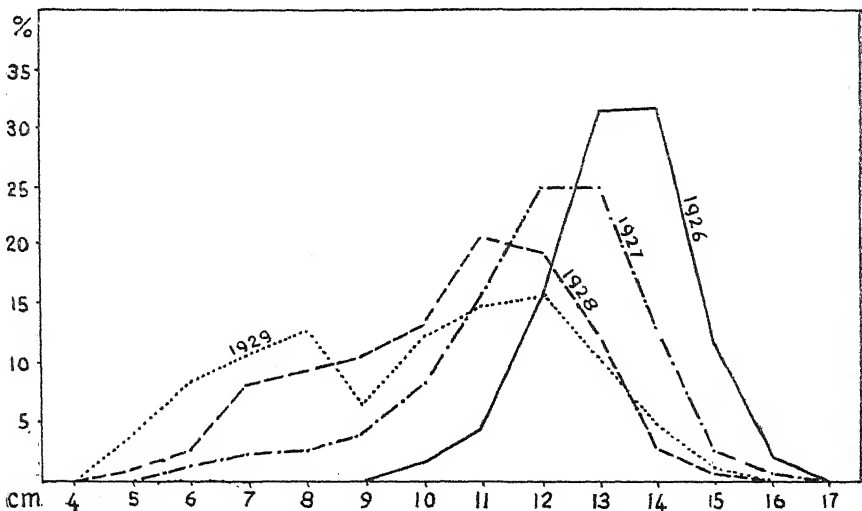


FIG. 6.

Diagram showing the size (as estimated from the scales) at the formation of the first winter ring of fish of year class 1924, caught in 1926, 1927, 1928 and 1929.

precocious, or very rapidly growing, fish which are only noticed because, being part of an abundant year class, their numbers are large in proportion to the stock of older fish.

By an examination of the scales of older fish it can be shown that the stock of four-year-olds is augmented by slow-growing recruits which had not previously put in an appearance as three-year-olds, and even some of the five-year-olds appear to have arrived for the first time. The diagram (Fig. 6) shows the estimated sizes when the first ring was formed, *i.e.*, at nearly one year old, of fish of the 1924 year class, from samples taken when they were respectively two, three, four and five years old. This year class has been selected as showing the phenomenon exceptionally clearly, but the fish of every year class show it also, though not in such a marked manner. From this diagram it may be inferred that there were present in 1929 an appreciable number of fish of the 1924 year class, with indications of very small first year's growth, which had not been represented in previous appearances of that year class.

THE IRISH HORSE.

When considering the various influences which have played a part in horse breeding in Ireland it should be borne in mind that the horse is, perhaps more often than any other animal, susceptible to climate and environment. Imported breeds become, with the lapse of time, materially altered in their general characteristics, and, when crossed with native strains, are generally assimilated by them until there is produced what might be regarded as a single type approximating to that which is indigenous to the country. This is true of all countries, but may be said to apply with double force in the case of Ireland, where, it is generally admitted, the soil and climate are singularly well adapted to the development of high-class horses of a distinct stamp. The success of the horse-breeding industry in Ireland and the reputation which Irish-bred horses have earned in almost every country is due in a large measure to the close attention given to the selection of brood mares and of sires. The mild climate, the limestone soil, the outdoor methods of rearing and the fact that grass is available for the greater part of the year have also had a considerable effect. The vast tracts of limestone pastures, especially in the southern, midland and western counties of Ireland, are ideal for the rearing of horses with good bone and stamina. Thoroughbreds are raised mainly in the south, but, generally speaking, the light draught and hunter type predominate and are widespread over the whole country. The majority of Irish farmers take pride in owning and breeding good horses. In this connection, Mr. F. Moss, an American, writing in the "Thoroughbred Record" (an American Journal) in February, 1933, states "Just one word about Irish-bred horses. No country in the world is better suited than Ireland for breeding and raising horses and no people more intelligent in breeding horses than the Irish."

Domestic horses were probably introduced into Ireland long before the Christian era and, prior to the date of recorded importations, a hardy native race of horses already existed in the country. In early days there was little tillage in Ireland but the care of flocks and herds as well as the needs of warfare demanded the services of an active enduring horse. This animal—evolved under the influence of Irish soil and climate from native strains with an admixture of Spanish blood—may be regarded as the ancestor of our present-day Irish horse. It must have been a riding horse of considerable merit, as it was highly prized in England from a very early date. Gervase Markham has described it as possessing "a fine head and strong neck, a well cast body, strong limbs, sure of foot and nimble in dangerous places, of lively courage and tough in travel." The name "Hobby" was given to this animal. Large numbers of these Irish Hobbies were exported to England, where it is recorded that, along with other hardy strains of small horses, they entered into the formation of the racehorse with the cross of a great amount of Eastern blood. One notable instance is that of the Hobby mare

(1715 A.D.) by The Lister Turk. Out of this Hobby mare Curwen's Bay Barb begot Brocklesby Betty, a famous brood mare.

The beneficial influence of pony blood at the foundation of some of our best breeds of horses must be emphasised. Excellent qualities denoting a high order of equine intelligence and hardiness of constitution may be traced to this source. In more recent times the Connemara pony—which is not a pony in the true sense of the word but rather a small horse—has, where used for crossing purposes outside its native district of Connemara, proved its worth as a begetter of useful and valuable horses.

About the beginning of the eighteenth century a number of stallions of Eastern blood were introduced from England and these, mated with native mares, produced what is considered to be the parent stock of the present-day Thoroughbred, the breeding of which may be said to date from that period. In the eighteenth century, racing became general in Ireland and gave a great stimulus to the breeding of Thoroughbred horses in the country. Valuable stallions were imported, and towards the middle of the century upwards of a hundred imported Thoroughbred sires were serving in Ireland.

At the close of the eighteenth century a great increase in the area of land under tillage took place, and this created a demand for a bigger, stronger and more docile horse than was required when the land was chiefly devoted to the rearing of flocks and herds. The people were therefore compelled to select the heavier of their native horses for the production of animals of a type suited to farm work. The animal produced in this manner must have been a farm horse of good quality, for he filled that position when Ireland was largely engaged in tillage. He was also a roadster of sufficient merit to suit the requirements of a farming population, and, though somewhat coarse for hunting, he had a natural liking for the sport, as shown by his high spirit and the readiness with which he took to jumping. One of the most valuable characteristics of this type of animal was its suitability for crossing with the Thoroughbred. To this cross we owe the Irish Hunter, which has established for Ireland a world-wide reputation. Its fame has spread to many lands and the big demand in many countries for this superb saddle horse has resulted in its widespread and general production. The numerous foreign visitors and buyers who attend the great annual Dublin Horse Show and other shows and fairs throughout the country are impressed by the large collections of well-bred, well-mannered riding horses to be seen at these fixtures, and wonder is often expressed as to how horses of so uniform a type can be produced in such large numbers.

The published remarks of a French visitor to the Dublin Horse Show may be worth quoting in this respect. The article is based on a visit to the Royal Dublin Society's Horse Show some few years ago, but the author makes it clear that the views expressed are not alone his own personal impressions but embrace those of a number of other members of the French Army Horse Breeding Society who visited the Show on the same occasion. The visitors devoted themselves to a careful study of the Irish Hunter as he appeared

at the Dublin Show. The following passages contain their impressions on the subject:—

“The committees entrusted with the work of judging the hunters have a heavy task. The manner in which the work was done—rapidly, silently, and with precision—was a source of considerable wonder to those who saw it for the first time. On the first day takes place the judging of all the classes which comprise saddle horses. All mounted from the moment of leaving the stall, almost all turned out in the same way with smooth manes and long flowing tails, coats glossy and shining from careful grooming and good condition, they enter the ring one after another. Within five minutes, without any jostling, the avenues have poured their contents into the place where they ought to be; everything is ready, and it is now the judges’ turn.”

After a detailed account of the critical methods adopted by the Judges in adjudicating, the writer proceeds as follows:—

“Since we are to give a faithful account of what we saw, we must say something of the type of the 866 hunters we examined at our leisure during four days. Taken *on the whole* they present the rarest unity of type that one could desire; in the case of nearly all, certain salient points were *invariably the same* forcing themselves upon our attention from the very first, and the image of those points, far from being effaced by subsequent criticisms, only imprinted itself still more clearly upon our minds. An extremely powerful muscular frame is shown, particularly in the massiveness of the quarters; the back thighs which are so muscled up as to *literally stand out well over the hocks* are full, firm and well rounded. An amateur standing near me during a visit to the stables remarked in this connection: “What a pity to show the horses so fat,” and we had to point out to him later that horses which were referred to as “fat,” after *several hours gallop* in public had not turned a hair, in order to convince him that those great ranging quarters were built up of something far other than fat! And beneath those muscles, what bones! The hocks are strong, clean and generally well shaped; the knees are broad and close to the ground, supported on short cannon bones and of an apparent girth which is often surprising. When we verify their measurements, we often find dimensions 8-3, 8-7 inches and upwards. The depth of chest is remarkable, the lengthy withers put the saddle well back into its place far behind a shoulder which is well sloped back. These qualities, far from being what are too often thought to be the exception, are found in all the animals, whether they be 4, 5 or 6 year-olds, whether of light, medium or heavy weight, whether it be a horse at the price of £80 or one at £400. This is the first great lesson which we ought to learn from the Dublin Horse Show; that it is possible, *since it is the case*, to find in one and the same place more than 800 horses which are *all* of saddle-horse type. It is indeed true that in that number some animals are inferior to others—and

this is the main point brought out by what we have just said, namely, that it is not necessary to go to the choicest, the élite, to find symmetrical build. Very few are, frankly, common; but what we feel bound to proclaim loudly is that in all this mass of hunters we did not see a single one of these animals with weak legs, crooked, badly-set hocks, punchy in the barrel and coarse of the shoulders.

But if the type is always correct, what shall be said of their paces? They can all *walk*, and what suppleness, lightness and naturalness are displayed in their gallop. We are not speaking here only of the classes designated as light weights and medium weights (and let us remark in passing that the so-called *light weights commence at twelve stone*), but still more of those extraordinary animals known as weight carrying hunters. Herculean creatures unknown on other shores, roomy as waggon horses, squarely planted on enormous limbs, regular mastodons, here they are in the ring where the judging of them is just being concluded. A Judge six feet high comes up and gets into the saddle. The colossus at once comes to life, and from that glossy mass, on which gleams a flashing ray of sunshine, comes a long skimming motion; it is wonderful to see how, under the pair of giants, the facile tracks are successively cut upon the velvet turf, with the careless ease of a stag in the forest. After him gallop the others one by one in the same style, and to the minds of some spectators, standing incredulous before this prodigy, there comes a dawning notion of what these animals are worth. And let it not be supposed that this quality of action is peculiar to a few high-priced animals; it is present in them all to a varying degree. All were visibly born to show that easy swinging gallop, and thus to exemplify that universal adaptation, that admirable unity in lightness, that suppleness and smoothness of the true saddle-horse action. Perceiving that, as the saying has it, 'the proof of the pudding is in the eating,' the majority of the French visitors present insisted on assuring themselves in practice of what their eyes had already so plainly told them. Thus we saw on different occasions during the following days these visitors trying, *in the saddle*, one after another, animals of very different values. Whether it was a horse worth £50 or a hunter worth £250 or more, their verdict was the same: 'It's simply wonderful to ride them! The pudding was always good.' "

These horses are in most cases the progeny of Thoroughbred sires and Irish Draught mares or mares of that type having one or more crosses of Thoroughbred blood. Given a good, strong, clean-legged mare to mate with a Thoroughbred sire, hunter breeding is attended with a considerable degree of success, and it is to the existence of the foundation stock of hunter brood mares that Ireland owes its reputation for the production of hunters.

What manner of mare it may be asked is this famous "old Irish" dam to which the Irish hunter owes so much? Broadly speaking, she is of medium size, 15-1 to 15-3 in height, short in her back, powerfully knit across the

loin and well developed in her hind quarters. In general outline she is of the low and roomy type; she stands close to the ground, is very muscular in her fore arm, and clean and flat in her bone below the knee. Though so deep and well balanced in outline as to give the impression of being on the small side, she covers a lot of ground and her legs are devoid of anything approaching the nature of "feather." As a rule, the head is fine, and clean cut in outline, though coarseness is more frequently seen in this than other parts of the body. The neck is long, the shoulder well laid, and, as becomes mares specially adapted for the production of high-class saddle horses, the withers are high and the ribs well sprung. The brief outline thus given of her general appearance would not go to represent the Irish mare as possessing many special attributes calculated to distinguish her as a hunter breeder. It is not to her looks alone but to a natural hardihood of constitution, begotten of the conditions under which she is kept and the work at which she is engaged that the progeny of the Irish Draught mare are indebted for many of the good qualities possessed by them. Quite a large percentage of the mares by which Irish hunters are produced are the property of small farmers, who use them for every class of work on their holdings—for ploughing or harrowing one day, for hauling heavy loads of farm produce the next, and on the third, perhaps, for driving to market at an eight or nine miles an hour trot. Usually obliged to rough it in all weathers, these mares have acquired a hardiness, a staying power, and a physical fitness which stands them in good stead in their capacity as breeders. The result is the evolution of the clean-limbed, hardy, active and spirited type of horse which has done so much to help the Irish hunter in establishing its great reputation.

The raising of hunters is confined mainly to the Southern, Midland and Western counties of Ireland. In these areas, there are available for mating with Irish Draught and hunter brood mares a number of high-class Thoroughbred stallions, most of which have been bred in the country and have proved their worth on the turf; in addition, some Thoroughbred stallions have, from time to time, been imported from England. In their young days, colts are given a free range on pasture and receive no special attention. They are broken when about three years old, and are then put to light farm work of various kinds for a year or two. This practice, in addition to their breeding, has a wonderful effect on the temperament of the young horses, and is largely responsible for the good manners and cleverness which characterise the Irish hunter. It is customary to find the tillage work on some farms being done entirely by hunters in the making. In addition to doing light work, the young hunter is taken out occasionally by the farmer or his son for a run with the local pack, and thus gets early experience of the work for which he is ultimately destined.

The opportunities for training young horses in the hunting field are numerous. In each of the seasons 1934-35 and 1935-36 fifty-two packs of hounds and harriers were in commission throughout Ireland. These packs hunt on an average three days per week, and in addition, hold point-to-point race meetings at the end of the season. Seventy-one point-to-point meetings

were held in 1934-35 and seventy-four in 1935-36, some of the principal packs holding two such meetings. These meetings are the chief nursery for the hunter and steeplechaser. The point-to-point test is known as the honours examination of the horse university. The numbers of horses which ran in these races in the two seasons in question were 1,106 and 1,148 respectively and, as these were the pick of the horses hunted with the various packs, the number of hunters in commission relatively must be ten times that number. Many of these are sold annually, and make their names as 'chasers.

The encouragement of horse breeding is a matter of national importance, but it was not until the year 1887 that any attempt was made by the Government to foster it. In that year an annual grant of £5,000 for the improvement of live stock in Ireland was made, and the Royal Dublin Society was entrusted with the administration of this sum, of which £3,200 was allocated for horse breeding. So far as it applied to horses, the grant in question was expended by the Society in the form of premiums to stallions which were distributed throughout the country in accordance with local requirements. This system was continued up to the year 1891, when the payment of premiums was discontinued, and the money devoted to the provision of free, or partly free, nominations to mares. In conjunction with this nomination system, a Register of Thoroughbred stallions passed as sound and suitable for stud purposes was issued annually. The number of stallions so registered in 1892 was 101, and in 1900 the number rose to 201. The work of encouraging improvement in horse breeding was transferred to the Department of Agriculture on its establishment in 1900. With the more ample funds at its disposal, and with the help of a committee of experts representing the various horse breeding interests of the country, and the machinery set up through the medium of the Committees of Agriculture, the Department was enabled to undertake schemes for the improvement of horse breeding on a much more extended scale.

The principle upon which the Department proceeded was to keep the breeding of certain types of horses distinct, with the object of preventing, so far as practicable, the mixture of breeds whose crossing tended to degeneracy rather than improvement. Effect was given to this principle by delimiting the areas in which the breeds approved were to be encouraged. Over the greater part of Ireland, the breeding of the hunter type was carried on. For this purpose, the sires encouraged were the Thoroughbred, and, in order to keep up the balance of bone and substance, the Half-bred.

Up to the year 1907, Thoroughbreds were the only sires available in many districts for the service of nominated mares but, in view of the need for tillage purposes in many parts of the country of horses of a somewhat heavier stamp than the produce of the Thoroughbred, it was felt that efforts should be made to breed a stronger type of horse from the material already in the country. This question was pressed upon the Department by interested breeders, who advocated the formation of a stud of Irish Draught horses which had not been crossed with cart sires of imported breed, and in 1904

the Department introduced an experimental scheme under which subsidies of £50 per annum were offered in respect of approved stallions of the Irish Draught and hunter type. Twelve stallions were approved under this scheme, and were subsidised in the years 1905 and 1906. In 1907, a total of 38 Half-bred stallions, including some of the Irish Draught type, were entered in the Department's Register. The recognition of such horses was warmly supported by the public, and their number has increased year by year.

In the year 1911, the Department, having received a grant for the purpose from the Development Commissioners, issued a scheme for the registration of mares of the Irish Draught type, the owners of which were prepared to mate them with stallions selected as being suitable for the purpose. This scheme showed that there was in the country material for the establishment of a breed of clean-legged draught horses for which there is, and always will be, a demand. Furthermore, the scheme resulted in the production of a number of good young colts of Irish Draught breeding which were retained as sires in the country and were available for the service of registered mares.

In 1917, the Department decided to make a special effort to revive on permanent lines the breeding of the native draught horses in Ireland, and, with this object in view, they established a Book for horses of Irish Draught type. The number of animals entered for inspection was satisfactory, applications being received in respect of some 1,180 mares and 270 stallions. As a result of these inspections, 375 mares and 44 stallions were passed as sound and suitable for entry in the Book. In the years 1935 and 1936 the total number of mares and stallions accepted for entry in the Book had reached 1,452 and 1,886 mares and 175 and 198 stallions, respectively. In making their selections of mares, a good average standard is adopted by the Inspectors, and they are particularly careful to exclude mares showing coarseness or signs of imported cart-horse blood. With regard to the stallions, a high standard of merit is set by the Inspectors, and no stallion is recommended for entry if there is any doubt either on the score of general merit or in the matter of pedigree. The main considerations are good general conformation and true Irish Draught character and weight. The question of action also receives considerable attention, and all animals selected are straight and true movers.

The selected animals, both mares and stallions, are subjected to a strict veterinary examination before being recommended for entry in the Book.

Each year an inspection is made of two-year-old colts and fillies, the progeny of registered stallions and registered mares. These colts and fillies which, on inspection, are found to be sound and suitable are entered in the Book as registered animals. To encourage owners of registered Irish Draught mares to breed from stallions of the same type, free nominations are granted annually, provided that the mare is sent to a registered Irish Draught stallion. Particulars of the progeny of such matings are carefully recorded, and steps are taken to have the produce, when two years old, presented for examination at the annual inspections.

In addition to the Irish Draught scheme, the Department established a general horse breeding scheme which may be considered under two heads, viz.,

- (a) The registration of stallions, and
- (b) Nominations to mares.

In connection with the registration of stallions, applications are invited annually from owners of stallions for the inclusion of sires on a Register which is published at the commencement of each service season. These horses are inspected and examined for soundness, and such as are passed as sound and suitable are included in the Register and are eligible for the service of nominated mares. Each spring, the Committees of Agriculture hold local shows of mares at which the most suitable animals are selected and subjected to veterinary examination. The owners of these mares are then given the option of having such mares served by any stallion on the Register which the mare owner selects, the service fee or portion thereof being paid by the Committee. In selecting mares for these nominations, the Inspectors endeavour to give preference to young mares and to award nominations in proportion to the breeds of horses most prevalent in and best suited to the district concerned. About 3,000 nominations are awarded annually at an approximate cost of £6,000.

In 1920 an Act came into force which made it an offence for any person to use a stallion for stud purposes unless the horse was at the time licensed. All stallions for public service were inspected, and only sound and suitable animals were granted licences.

This Act has now been replaced by the Horse Breeding Act, 1934, which provides that the owner of every entire horse, two years old and upwards, must obtain either (1) a licence or (2) a permit authorising him to keep the horse entire. The permit is issued on the understanding that the sire will not be used for stud purposes. Stallions entered in certain recognised Stud Books are eligible for entry on a list of exempted stallions kept by the Minister for Agriculture, provided such sires are not used for the service of mares other than mares approved by the Minister or than mares entered in a recognised Stud Book; or provided that they are used exclusively for racing; or are in training for racing.

A Consultative Council has also been appointed for the purpose of advising the Minister in matters affecting the operation of the Act. Recently a Commission was appointed by the Minister to inquire into and report upon the present condition of the horse breeding industry. This Commission held 46 public meetings at which witnesses representing all the interests concerned were examined. The Report of the Commission has been presented to the Minister, and the recommendations made are at present receiving careful and detailed consideration.

These various measures have resulted in the production throughout the country of high-class riding horses, which are offered for sale in large numbers at the annual shows and fairs held all over the country.

The performances of Irish Army horses in jumping competitions held on

the Continent of Europe and in the United States and Canada, show that Irish-bred jumpers can more than hold their own with the pick of the horses in other countries. In this connection a list of prizes won since 1934, which speaks for itself, is given at the end of this article.

In the 'chasing world, the record of Irish-bred horses is outstanding. From the year 1900 to 1936, Irish-bred horses won the Grand National at Liverpool on twenty-five occasions. In the year 1936, more than 50 per cent. of the starters for the Grand National were Irish-bred 'chasers. There were actually 35 starters, of which 18 were Irish-bred. Ten horses completed the course, of which five were Irish-bred including first, second and third places. The Grand National is run over a course more than four miles long, with a series of jumps averaging over five feet, and it requires a horse of exceptional courage and stamina to last out this gruelling test.

The breeding of Thoroughbred horses in Ireland is a matter of private enterprise and it has been carried on most successfully over a long period, as the continual success of Irish-bred horses in the racing world indicates.

Tables are appended showing (1) successes achieved by Irish horses at various Shows in Europe and America; (2) races in Great Britain won by Irish horses in 1935 and 1936 and (3) races won by Irish horses in twenty-one countries in 1935.

SOME SUCCESSES ACHIEVED BY IRISH HORSES AT VARIOUS HORSE SHOWS IN EUROPE AND AMERICA.

LIST OF FIRST PRIZES WON.

1934

<i>Show</i>	<i>Competition</i>				<i>Horse</i>
Berlin	..	Prize of Berlin	..	..	Limerick Lace
Olympia	..	Class 69A	..	..	Blarney Castle
do.	..	Claude Beddington Cup (Class 71)	..	..	Kilmallock
do.	..	Irish Army Cup (Class 77)	..	..	Tramore Bay
Lucerne	..	Prix du Stanserhorn	..	..	Rosnaree
do.	..	Prix du Meggenhorn	..	..	Ireland's Own
do.	..	Swiss Cavalry Prize	..	..	Blarney Castle
R.D.S. Dublin	..	Event No. 2.	..	..	Blarney Castle
do.	..	Swiss Cavalry Cup	..	..	Limerick Lace
do.	..	Saorstát Trophy	..	..	Limerick Lace
New York	..	Brooks Bright Cup	..	..	Salmon Leap
do.	..	Westchester Cup (For Teams)	..	..	Ireland's Own
					Slievenamon
					Gallowglass
do.	..	Class 109	..	..	Slievenamon
do.	..	Class 116	..	..	Tramore Bay
do.	..	International Mil. Individual Trophy	..	..	Limerick Lace
Toronto	..	Class 106	..	..	Slievenamon
do.	..	Class 111	..	..	Salmon Leap
do.	..	Class 115	..	..	Ireland's Own

1935

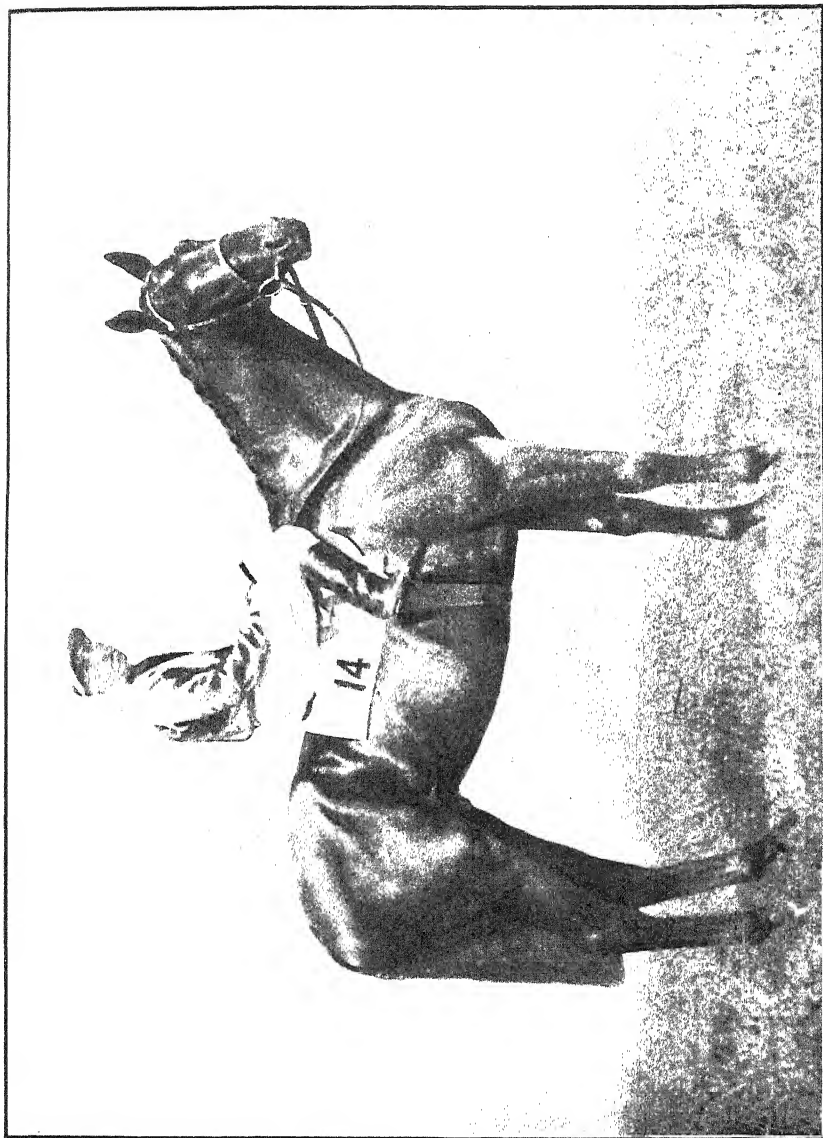
<i>Show</i>	<i>Competition</i>				<i>Horse</i>
Amsterdam	..	Jachtparrden	..	..	Limerick Lace
Olympia	..	Class 80A	..	..	Gallowglass
do.	..	Class 84	..	..	Tramore Bay
do.	..	Class 85 (The King's Cup)	..	..	Tramore Bay
do.	..	Class 91 (The Daily Mail Cup)	..	..	Limerick Lace
Lucerne	..	Swiss Cavalry Cup	..	..	Limerick Lace
do.	..	Prix de St. Georges	..	..	Gallowglass
do.	..	Prix de Pilate	..	..	Limerick Lace
do.	..	Prix du St. Gothard	..	..	Ireland's Own
do.	..	Prix des Nations (For Teams)	..	..	{ Blarney Castle Ireland's Own Limerick Lace
R.D.S. Dublin	..	Event No. 5. (R.D.S. Horse Show Committee Cup)	..	..	Ireland's Own
do.	..	Event No. 4 (Aga Khan's Cup) (For Teams)	..	..	{ Limerick Lace Blarney Castle Miss Ireland
New York	..	The Bowman Challenge Cup	..	..	Gallowglass
do.	..	1,000 Dollars Stake	..	..	Owen Roe
do.	..	International Military Challenge Trophy (Nations' Cup—for Teams)	..	..	{ Blarney Castle Red Hugh Glendalough Limerick Lace
Toronto	..	Class 107	..	..	Gallowglass
do.	..	Class 110	..	..	Blarney Castle
do.	..	Class 113 (Nations' Cup—For Teams)	..	..	{ Blarney Castle Gallowglass Glendalough
do.	..	Class 116	..	..	Gallowglass
do.	..	Class 99	..	..	{ Limerick Lace Duhallow
Nice	..	Grand Prix de la Ville de Nice	..	..	Ireland's Own
do.	..	Prix de l'Ecole de Cavalerie de Hanovre	..	..	Blarney Castle
Rome	..	Primio Pincio	..	..	Blarney Castle
Brussels	..	Prix des Habits Rouges	..	..	Gallowglass

1936 (January—June).

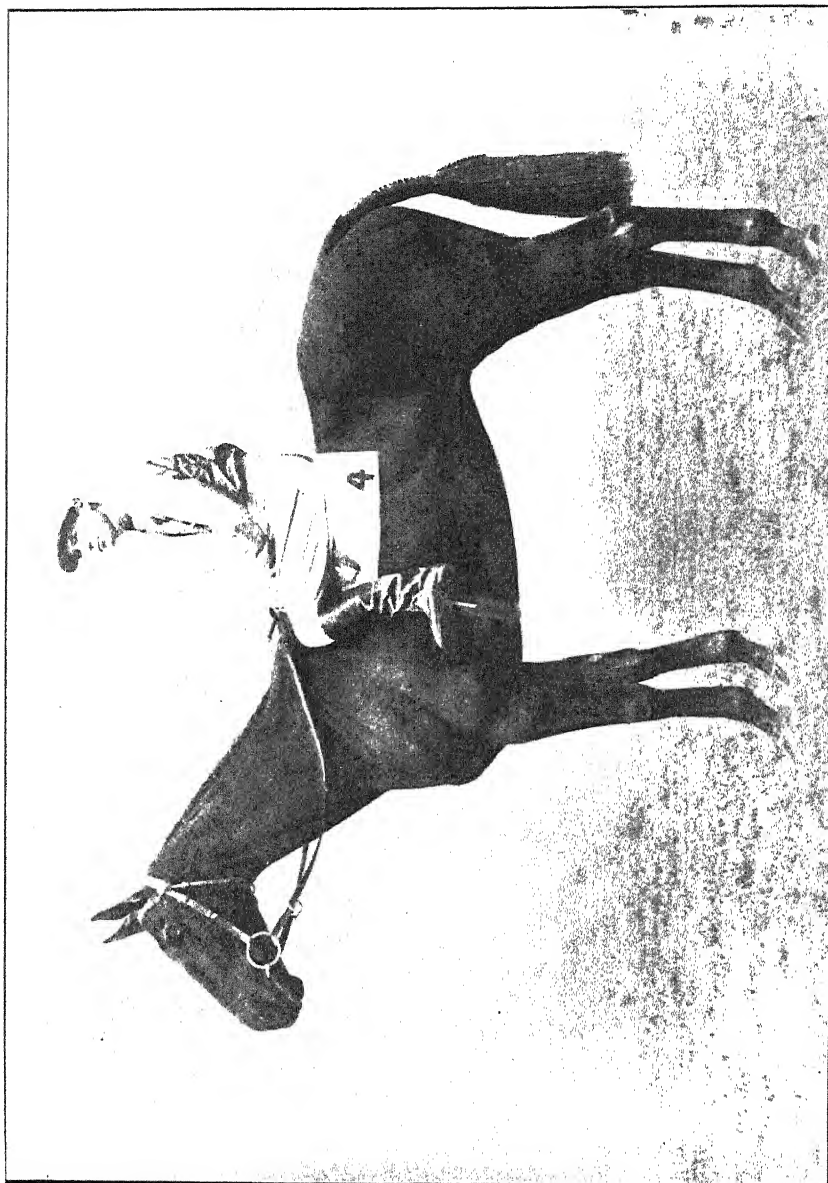
<i>Show</i>	<i>Competition</i>				<i>Horse</i>
Lucerne	..	Prix du Stanserhorn	..	..	Blarney Castle
do.	..	Swiss Cavalry Prize	..	..	Limerick Lace
do.	..	Prix de St. Georges	..	..	Red Hugh
do.	..	Prix du Meggenhorn	..	..	Clontarf
do.	..	Prix du St. Gothard	..	..	Limerick Lace
do.	..	Prix des Lido	..	..	Miss Ireland
do.	..	Prix des Nations (For Teams)	..	..	{ Blarney Castle Red Hugh Glendalough Limerick Lace
R.D.S. Dublin	..	Event No. 4. (Aga Khan's Cup) (For Teams)	..	..	{ Duhallow Red Hugh Glendalough
do.	..	Event No. 5. (R.D.S. Horse Show Committee Cup)	..	..	Red Hugh
Nice	..	Prix des Spahis	..	..	Limerick Lace
do.	..	Prix de la Cavalerie Belge	..	..	Ireland's Own
do.	..	Coupe de la Cavalerie Espagnole (For Teams)	..	..	{ Limerick Lace Gallowglass Red Hugh Kilmallock
do.	..	Prix de l'Armée Polonaise	..	..	Blarney Castle
do.	..	Prix de la Cavalerie Portugaise	..	..	Miss Ireland
do.	..	Coupe de Ministère des Affaires Etrangères (Teams)	..	..	{ Limerick Lace Blarney Castle Red Hugh Kilmallock
Amsterdam	..	Prix des Nations (for Teams)	..	..	{ Blarney Castle Kilmallock Limerick Lace
Olympia	..	Class 82B	..	..	Gallowglass (Div. 1st).
do.	..	do.	..	..	Limerick Lace (Div. 1st).
do.	..	Class 82c	..	..	Blarney Castle (Div. 1st).
do.	..	Class 83B	..	..	Clontarf (Div. 1st).
do.	..	Class 84A	..	..	Gallowglass (Div. 1st).
do.	..	Class 87	..	..	Limerick Lace (Div. 1st).
do.	..	Class 87	..	..	Tramore Bay (Div. 1st)
do.	..	Class 88 (King's Cup)	..	..	Limerick Lace

PRINCIPAL RACES IN GREAT BRITAIN WON BY IRISH-BRED
HORSES IN 1935 AND 1936.

<i>Winner</i>	<i>Race.</i>
Reynoldstown	.. Grand National Steeplechase, 1935.
do. ..	.. Grand National Steeplechase, 1936
do. ..	.. Shawn Spaddah Handicap 'Chase, Lingfield, 1936.
do. ..	.. Mapperly 'Chase, Leicester, 1936.
Ego ..	.. Three Mile 'Chase (Hawthorn Hill), 1936.
do. ..	.. Second, Grand National, 1936.
Bachelor Prince	.. Third, Grand National, 1936.
Double Crossed	.. Champion Steeplechase, Liverpool, 1935.
do.	.. Glanely 'Chase, Cardiff, 1936.
Canteener	.. Newbury Silver Coronation Cup, 1935.
Cooleen ..	.. Lancashire Steeplechase, Manchester, 1935.
Ankaret ..	.. Esher Cup, Sandown, 1935.
do. ..	.. Coronation Stakes, Ascot, 1935.
Bahram ..	.. 2,000 Guineas Stakes, 1935.
do. ..	.. Derby Stakes, 1935.
do. ..	.. St. James Palace Stakes, Ascot, 1935.
do. ..	.. St. Leger Stakes, Doncaster, 1935.
Precious Pearl	.. Victoria Cup, Hurst Park, 1935.
Windsor Lad	.. Coronation Cup, Epsom, 1935.
do. ..	.. Rous Memorial Stakes, Ascot, 1935.
do. ..	.. Eclipse Stakes, Sandown, 1935.
Enfield ..	.. Queen Alexandra Stakes, Ascot, 1935.
Cariff ..	.. Bessborough Stakes, Ascot, 1935.
do. ..	.. Bessborough Stakes, Ascot, 1936.
Theft ..	.. Jersey Stakes, Ascot, 1935.
do. ..	.. Rosebery Stakes, Kempton, 1936.
Finalist ..	.. Britannia Stakes, Ascot, 1935.
do. ..	.. Newbury Spring Cup, 1936.
J. R. Smith	.. Hardwicke Stakes, Ascot, 1935.
Fairbairn	.. Princess of Wales Stakes, Newmarket, 1935.
Desert Night	.. Great Foal Plate, Lingfield, 1935.
Trigo Verde	.. Yorkshire Oaks, 1935.
Harina	.. Imperial Produce Stakes, Kempton, 1935.
Bala Hissar	.. Dewhurst Stakes, Newmarket, 1935.
Emborough	.. Liverpool Autumn Cup, 1935.
do.	.. Manchester Cup, 1936.
Free Fare	.. Manchester November Handicap, 1935.
do.	.. Lingfield Hurdle Cup, 1936.
Overcoat	.. Lincolnshire Handicap, 1936.



WINDSOR LAD. Winner of the Derby Stakes, Chester Vase, Newmarket Stakes. Sired by BLANDFORD (Bred at the National Stud, Tully, Co. Kildare). Dam — KESPLENDENT (A former Oaks winner, bred by Mr. Daniel Sullivan at his farm near Dublin). Sold for about £50,000.

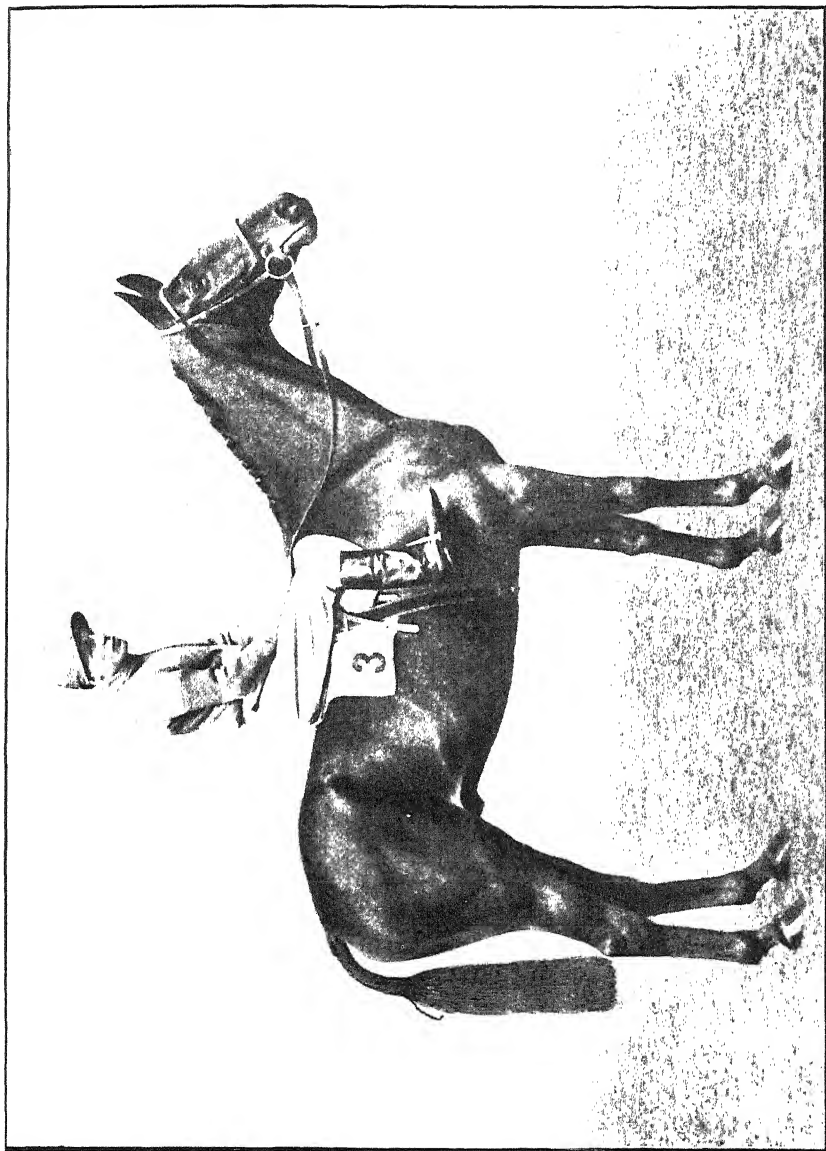


Major Furlong's REYNOLDSTOWN. Bred by Mr. Richard Ball, The Naul, Co. Dublin.
Winner of the Grand National Steeplechase in 1935 and 1936.

[W. A. ROUCH, Copyright]

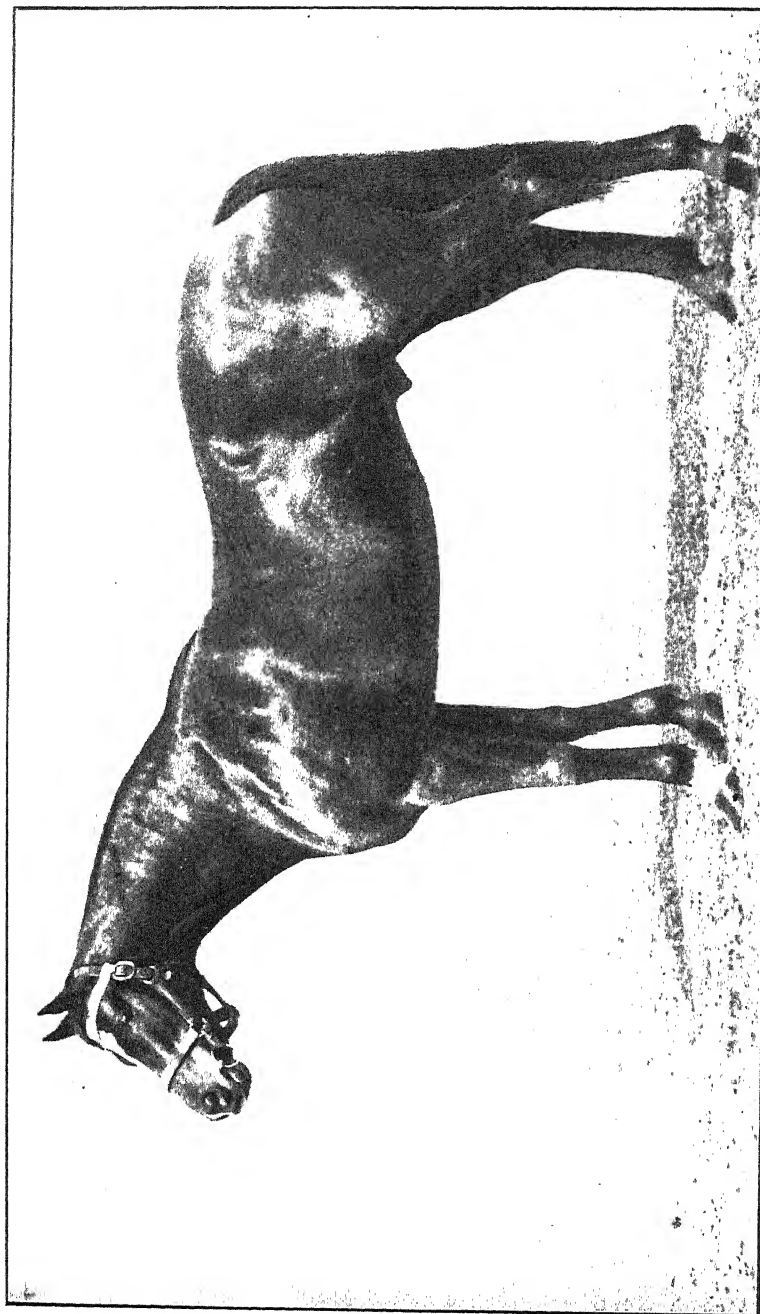
<i>Winner</i>	<i>Race</i>
Guinea Gap	.. Liverpool Spring Cup, 1936.
do.	.. Royal Hunt Cup, Ascot, 1936.
Couvert	.. Coventry Stakes, Kempton, 1936.
Jack Tar	.. Great Metropolitan, Epsom, 1936. (Dead-heated with Quashed).
His Reverence	.. City and Suburban Handicap, 1936.
Taj Akbar	.. Nonsuch Plate, Epsom, 1936.
do.	.. Chester Vase, 1936.
do.	.. Princess of Wales Stakes, Newmarket, 1936.
Silver Crest	.. Esher Cup, Sandown, 1936.
Foray	.. Sandown Park Stud Produce Stakes, 1936.
do.	.. July Stakes, Newmarket, 1936.
do.	.. Convivial Plate, York, 1936.
do.	.. Champagne Stakes, Doncaster, 1936.
Magnet	.. Hastings Stakes, Newmarket, 1936.
do.	.. Gordon Stakes, Goodwood, 1936.
Hairan	.. Victoria Cup, Hurst, 1936.
Barrystar	.. Derby Trial Sweep Stakes, Lingfield, 1936.
Saraikala	.. Lingfield Foal Stakes, 1936.
Cho-Sen	.. Chester Cup, 1936.
Inflation	.. Kempton Park "Jubilee", 1936.
Tip the Wink	.. Spring Stakes, Newmarket, 1936.
Lovely Rosa	.. Oak Stakes, 1936.
Ivy Grey	.. Whitsuntide Foal Stakes, Manchester, 1936.
Barking Fox	.. Warwickshire Breeders' Foal Plate.
Ballywellbroke	.. Empire Handicap, Newbury, 1936.
Chirgwin	.. Newbury Summer Cup, 1936.
Bacardi	.. Berkshire Foal Plate, 1936.
Diplomat	.. Gatwick Foal Plate, 1936.
do.	.. Worcester Foal Stakes, 1936.
do.	.. Champion Breeders' Foal Plate, Derby, 1936.
do.	.. Newmarket Produce Stakes, 1936.
do.	.. Hurst Park Stakes, 1936.
Petoford	.. Lonsdale Foal Stakes, Doncaster, 1936.
Listoi	.. Churchill Stakes, Ascot, 1936.
Coup de Roi	.. Northumberland Plate, 1936.
do.	.. Newbury Autumn Cup, 1936.
Fourth Floor	.. Worksop Manor Foal Plate, 1936.
Sind	.. St. George Stakes, Liverpool, 1936.
do.	.. Atlantic Cup, 1936.
Dennis Blink	.. Knowsley Dinner Stakes, Liverpool, 1936.
Solerina	.. Steward's Cup, Goodwood, 1936.
Avondale	.. Goodwood Stakes, 1936.

<i>Winner</i>	<i>Race</i>
Silversol	.. Yorkshire Oaks, 1936.
Boswell	.. St. Leger Stakes, 1936.
Tumbrel	.. Newbury Autumn Foal Plate, 1936.
do.	.. Liverpool Autumn Foal Stakes, 1936.
Terror	.. Clearwell Stakes, Newmarket, 1936.
Vesington River	.. October Nursery Stakes, Newmarket, 1936.
Felsetta	.. Atalanta Stakes, Sandown, 1936.
Dan Bulger	.. Cambridgeshire Stakes, 1936.
Theddingworth	.. Liverpool St. Leger, 1936.
Young England	.. Liverpool Autumn Cup, 1936.
Newtown Ford	.. Manchester November Handicap, 1936.
Kellsboro Jack	.. Champion 'Chase, Liverpool, 1936.
Drinmore Lad	.. Valentine 'Chase, Liverpool, 1936
do.	.. Five Hundred Handicap 'Chase, Manchester, 1936
do.	.. Home 'Chase, Gatwick, 1936.
Drintoi	.. Shropshire Hurdle, Ludlow, 1936.
do.	.. Ellesmere 'Chase, Manchester, 1936.
Duke of Burgundy	.. Abbeystead Hurdle, Liverpool, 1936.
Golden Miller	.. Lattiford 'Chase, Wincanton, 1936.
do.	.. Cheltenham Gold Cup, 1936.
Hillsbrook	.. Spofford 'Chase (Waterby), 1936.
Jack Grange	.. County Handicap Hurdle, Ludlow, 1936.
do.	.. Col. John McKie Desmond Challenge Cup, Perth, 1936.
do.	.. National Hunt Flat, Market Rasen, 1936.
Old Tom	.. Wilton 'Chase, Sandown, 1936.
Pucka Belle	.. Holman Cup 'Chase, Cheltenham, 1936.
do.	.. National Hunt 'Chase, Cheltenham, 1936.
Red Park	.. Cranford Handicap 'Chase, Kempton, 1936.
Cairo	.. Duncrub Handicap Hurdle, Perth, 1936.
do. ..	.. Sunlaws Hurdle (Border Hunt), 1936.
Rooney	.. Surrey 'Chase, Gatwick, 1936.
do.	.. Pendle Novices 'Chase, Manchester, 1936.
Royal Mail	.. Becker 'Chase, Liverpool, 1936.
Silver Linnet	.. Lavington Challenge Cup, Warwick, 1936.
do.	.. Amateur's Handicap 'Chase, Kempton, 1936.
Sorley Boy	.. Welsh Grand National, Cardiff, 1936.
do.	.. Staines Handicap Hurdle, Kempton, 1936.
Southern Hero	.. Lingfield Open Handicap 'Chase, Lingfield, 1936.
do.	.. Maryblossom Handicap 'Chase, Lingfield, 1936.
do.	.. Scottish Grand National, Bogside, 1936.



GOLDEN MILLER. Irish-bred. By GOLDCOURT—MILLER'S PRIDE. Won the Grand National Steeplechase in 1934, registering the fastest time recorded in the history of the race.

[W. A. ROUCH, Copyright]



BLANDFORD, Bred at the National Stud, Tully, Co. Kildare. Celebrated Sire of
 Trigo ... Winner of the Derby Stakes in 1929
 Blenheim ... " " in 1930
 Windsor Lad ... " " in 1934
 Bahram ... " " in 1935

[H. J. ROUCHE, Copyright]

THE FOLLOWING TABLE SHOWS THE NUMBER OF RACES WON BY IRISH-BRED HORSES IN TWENTY-ONE COUNTRIES IN 1935.

<i>Country</i>				<i>Winners</i>	<i>Races</i>
Ireland and Great Britain	}	..	..	573	908
India	..	..	..	159	259
Denmark	..	..	..	37	73
Canada	..	..	..	4	10
Malay States	..	..	..	39	96
South Africa	..	..	..	29	52
Norway	..	..	..	25	61
U.S.A.	..	..	..	22	43
Belgium	..	..	..	13	27
France	..	..	..	11	25
Egypt	..	..	..	10	14
Mauritius	..	..	..	8	20
Italy	..	..	..	6	11
Jamaica	..	..	..	5	18
Australia	..	..	..	4	4
British West Indies	..	..	..	4	18
Sweden	..	..	..	4	6
Spain	..	..	..	2	2
Germany	..	..	..	2	4
Kenya	..	..	..	1	3

The History of the Potato and its Progress in Ireland*

by

W. D. DAVIDSON, B.A., B.Sc.

* The numbers in brackets relate to the bibliographical references arranged in alphabetical order at end of article—page 306.

I.—INTRODUCTION OF THE POTATO INTO IRELAND.

The potato was discovered by Pedro de Cieza de Leon, a Spanish soldier, in the Upper Cauca Valley in what is now Columbia in 1538, and mentioned by him on several occasions under the name "Papas" in his *Chronica del Peru*, published at Seville, 1553.

References to the potato in early writings, such as d'Acosta's *Historia* (23), *Narrative of Drake's Voyage* (25), and the *Third Circumnavigation of the Globe* (54), coupled with the discoveries of modern investigators, such as Wight (69), Stuart (61), and Safford (56), show clearly that the potato was in cultivation for many years—probably centuries—throughout portion of the north-west of South America before it was brought to Europe.

Russian workers in recent years made a thorough investigation of the cultivated and wild species of *Solanums* in Central and South America. They came to the conclusion that the European potato was of Chilian origin.

In a published article (40) it is stated: "As to the potatoes with 48 chromosomes, it proved to be true that the majority of the potato varieties now cultivated in Europe belong to the Chilian type."

The potato is known to have reached Europe in 1588 (17) and to have been grown, at least in a garden, in England a few years later (30); but under what circumstances, or at what date, the potato reached Ireland is not known. There is no definitely dated contemporary mention of the potato in Ireland before the middle of the seventeenth century; but numerous references then occur, all disclosing the fact that by that time the potato was extensively grown, showing that it must have been in the country for some considerable time.

Tradition associates the name of Sir Walter Raleigh with its introduction, and apparently all but a few modern writers were, to use Goldsmith's phrase, prepared to allow tradition to silence every inquiry.

The origin of the Raleigh tradition is of sufficient interest to warrant its investigation. Thomas Heriot may have laid the foundation of this belief when he wrote, in 1588, his apt description of the tubers of *Openauk* :— “ *Openauk* are a kind of roots of round forme, some of the bignes of walnuts, some far greater, which are found in moist and marish grounds growing many together *one by another* in ropes, or as thogh they were fastened with a string. Being boiled or sodden they are very good meate.” (39.)

Heriot's *Openauk* and Cieza's *Papas* appear to have been confused with each other, and practically all writers down to recent times accepted the idea that *Openauk* was the potato (*Solanum tuberosum*). This idea was never seriously questioned until 1877, when Gray and Trumbull pointed out that *Openauk* was a plant of the Bean family known as *Apios tuberosa* (Moench) (31).

It is not contended that Heriot's statement directly gave rise to the Raleigh tradition, but the general belief that *Openauk* was the Potato, and that *Openauk* was found by Heriot in Virginia where he had gone under the ægis of Sir Walter Raleigh, probably tended to give rise to the idea that Raleigh was associated with the introduction of the potato.

At a meeting of the Royal Society, December 18th, 1698, the President (Sir Robert Southwell) related that his grandfather brought potatoes into Ireland, who had them from Sir Walter Raleigh after his return from Virginia (7).

Little importance can be attached to Southwell's statement, particularly in view of the fact that at the previous meeting of the Royal Society on 6th December, Dr. Sloan related that “ the Irish potatoes were first brought from Virginia and that they were the chief subsistence of the Spanish slaves in the mines in Peru and elsewhere ” (7).

Banks (4) accepted Southwell's statement as correct, but MacAdam (44) Smee (57) and Safford (56) placed no value on this statement.

The fact that Raleigh was never in Virginia destroys any value that Southwell's statement otherwise might have had.

Another member of the Royal Society, John Houghton, is probably the originator of the Raleigh legend ; at least he is the first writer who definitely ascribed the introduction of the potato into Ireland to Sir Walter Raleigh. Houghton, writing in 1699, says : “ Potatoes from Virginia . . . Potatoe is a bacciferous herb, with esculent roots, bearing winged leaves and a bell flower. This, I have been informed, was brought first out of Virginia by Sir Walter Raleigh, and he stopping at Ireland, some was planted there, where it thriv'd very well and to good purpose ; for in their succeeding wars, when all the corn above-ground was destroyed, this supported them ; for the soldiers, unless they had dug up all the ground where they grew, and almost sifted it, could not extirpate them ; from whence they were brought to Lancashire, where they are very numerous, and now they begin to spread all the kingdom over ” (38). It is obvious Houghton's story is not correct,

from the facts that Sir Walter was never in Virginia, and that of the five expeditions for which he was responsible, only one touched at Ireland on the return journey, and that at Smerwick, County Kerry, with the crew in a state of semi-starvation (12).

Houghton's statement was copied almost verbatim without acknowledgment by Smith in his *History of Waterford*, published 1746. Smith's statement runs as follows :—"The *Potatoe* is a bacciferous herb with esculent roots bearing winged leaves, and a bell flower. They were originally brought out of *Virginia* by *Sir Walter Raleigh*, who stopping in this kingdom, some were planted here, where they have since throve very well, and to good purpose. For in the war time when all the corn above ground was destroyed, they supported the people. From this kingdom they were sent to *Lancashire*, where they are very numerous, and began to gain ground in *England*" (58). Judging from the number of copies of Smith's work that are still extant, it must have had a wide circulation at the time, so that the Raleigh story would have become generally known. No Irish writer prior to Smith has attributed the introduction of the Potato to Sir Walter Raleigh. In fact, the best of the early Irish writers on the potato, George Rye, in his work, *Considerations on Agriculture*, published 1730, says : "I shall not mind from whence they came, but leave that to the curious" (55). Rye was a native of County Cork, and apparently even in his day the introduction of the potato was a disputed question.

In his *History of Cork*, published 1750, Smith, when speaking of Youghal, says : "It was in this town that the first potatoes were landed in Ireland by Sir Walter Raleigh" (59). Smith, however, quotes no authority for his statement. Smith proved himself in many respects a most unreliable historian, but unfortunately numerous writers since his day accepted his statements without question, and so the Raleigh story gained credence.

In his *History of Waterford*, Smith takes his information regarding potatoes almost verbatim from Houghton, or from Rye, but a search has been made in vain to discover from what source he drew the information which he gives when speaking of potatoes in the neighbourhood of Youghal in his *History of Cork*. In continuation of the lines quoted above, he goes on to state : "The person who planted them imagining that the apple which grows on the stalk was the part to be used, gathered them ; but not liking their taste, neglected the roots, till the ground, being dug afterwards to sow some other grain, the potatoes were discovered therein ; and to the great surprise of the planter, vastly increased. From these few, this country was furnished with seed" (59). This story regarding the "apple" has been repeated with slight variations times without number.

Brushfield (12), Wakefield (68, Vol. I, p. 442), and many other writers attributed the introduction of the potato to Raleigh, but do not quote reliable proof of this assertion.

There are, however, two facts that lend some slight, very slight, support to the tradition. Raleigh secured a large estate in the neighbourhood and was Mayor of Youghal during the years 1588-9, which was probably about the time the potato was introduced. Furthermore, the potato was known and its cultivation well understood in that part of the country at a very early date.

It must be noted that all writers who do attribute the introduction to Sir Walter were posterior to Smith (58, 59) and were influenced by him.

Croker remarks that tradition says the potato root was planted on Sir Walter Raleigh's ground at Youghal and also on some land in the diocese of Tuam which Sir Walter afterwards let to endow a school (21, p. 53).

Campbell refers to the cultivation of potatoes at Youghal and states: "It appears they (potatoes) were brought into Ireland about the year 1610" (14, Vol. 3, p. 95). No authority is quoted for this statement.

Threlkeld (63) confused Heriot's *Openauk* with the potato. During the sixteenth century a large trade was carried on between this country and Spain (32), and names of Spanish origin were given to potatoes as late as the middle of the eighteenth century. John O'Neachtan (50), an Irish scholar, in a poem written about 1740, speaks of the potato as the white Spaniard ("Spáineach Geal"). These references show that at that time there was a belief that the potato came to this country through Spain.

The introduction of the potato was also attributed to Sir John Hawkins, but Banks shows that this was not probable (4).

Again, the introduction has been attributed to Sir Francis Drake. Pink, admittedly not a very high authority, contends that Drake brought the potato with him when he was returning with the colonists from Roanoke in 1586 (52, p. 11), but, of course, no authority is quoted for the statement.

Drake, however, when he returned to Plymouth on 9th August, 1573, after several successful ventures against the Spanish in South America, where he may have seized some potatoes, had to put to sea again to avoid arrest, as the friends of Spain were just then in the ascendant at Elizabeth's Court. He was compelled to hide for nearly two years, and chose a spot in Cork Harbour between Carrigaline and Crosshaven, still known as Drake's Pool. It is not impossible that he distributed a few tubers on this occasion, as he certainly knew something of their value. When making the second circumnavigation of the world, Drake met with the potato on two occasions, the first at the island of Mucho (off the coast of Chili) on the 25th November, 1578, and again at the Pelew Islands on the 30th September, 1579. Drake did not get back to England until 26th September, 1580, so that he could not have brought the potato home with him on this occasion (25).

It is not known in what year the potato was introduced into Ireland, or to whom the country is indebted for its introduction. There is no evidence that the potato was introduced by Sir Walter Raleigh, and nothing can be gained surmising by what means it reached Ireland in the absence of credible information.

II.—EARLY REFERENCES TO THE POTATO IN IRELAND.

The earliest reference to the potato in Ireland occurs in *The Montgomery Manuscripts*, which cover the period 1603–1706. These manuscripts were compiled between the years 1696 and 1706 from family papers by William Montgomery of Rosemount, Greyabbey, County Down. Speaking of the years 1606 and 1607, he states: “Her Ladyship” (Lady Montgomery) “had also her farms at Greyabbey and Coiner” (Comber, County Down) “as well as at Newtown, both to supply new-comers and her house; and she easily got men for plough and barn, for many came over who had not stocks to plant and take leases of land, but had bought a cow or two and a few sheep, for which she gave them grass and so much grain per annum and a house and garden-plot to live on and some land for flax and potatoes, as they agreed on for doing their work, and there be at this day many such poor labourers amongst us” (87).

This very important reference has been overlooked by all potato historians. The writer of the manuscripts was born in County Tyrone in 1633 and, although the reference quoted refers to a date 27 years before the author was born, yet Montgomery was so painstaking a writer he would scarcely have recorded this incident unless the potato was well known in his boyhood days. Later references prove beyond doubt that the potato was an important article of diet in Ireland by the middle of the seventeenth century. If Montgomery’s statement is correct, and there is no reason to doubt it, the potato must have been introduced early in the second half of the sixteenth century.

Fynes Moryson, in his *Ten Yeares Travell*, gives a detailed account of his stay in Ireland in 1602 and 1603 and refers to the diet of the people. He makes no reference to potatoes but mentions artichokes (48). A writer in the *Belfast Magazine* (1825) was of opinion that Moryson mistook potatoes for artichokes (3).

Dr. Beal, in a paper published in 1672, writes: “Potatoes were a relief to Ireland in their last Famine. They yield Meat and Drink” (5). This probably refers to the famine which occurred during the Cromwellian War, 1641–1652.

The same writer in another paper refers to the potato of Barbadoes, but expresses doubt as to any great differences between the potatoes of Barbadoes and those of Virginia (6).

The Council Book of the Corporation of Youghal lends support to the belief that the potato was early cultivated in that neighbourhood.

At a meeting of the Corporation held 26th May, 1623, amongst the various “Tolls and Customs agreed upon by the Mayor, etc.” occurs the item, “For eggs, poultry, apples, and such like fruit, roots, herbs sold at once to the value of 2s. 6d. to pay $\frac{1}{3}$ d. and so upwards” (16, p. 90.) It is not likely that the word “roots” could have been applied to anything but potatoes.

In a Proclamation issued by Lord Broghill, dated Youghal, 27th July, 1644, the word "roots" is again used thus: "Whereas the gardens in and near this town and liberties, are in great hope to be a good help to the inhabitants, if care be taken that the roots and fruit growing in them be duly preserved from the violence of soldiers and other inhabitants who have of late most wrongfully entered and destroyed same" (16, p. 546).

At a meeting of the Corporation held 6th November, 1716, it was decided "that the fees or dues to be taken hereafter by the person renting the Ferry or Passage aforesaid be as followeth: Imprimis—For all sorts of grain, rootes, etc. per barrel, 1d. ; per half barrel, $\frac{1}{2}$ d. ; per bushel and any quantity above a peck, $\frac{1}{4}$ d. . . ." (16, p. 410).

In this case "rootes" are given a prominent position, much more so than in 1623 ; and again, it is not at all likely that any plant but the potato could have been referred to.

The first time that potatoes are mentioned by name was at the Corporation meeting held 9th September, 1751, and the manner in which they are mentioned is very significant: "Whereas the taking off the custom on potatoes was intended as a benefit to the poor, but hath not the desired effect, the prices being rather higher than before, ordered, that the old custom of one penny per barrel, and halfpenny for any lesser quantity above one bushel, be levied after 29th September. Note: That this order is not designed to make any alteration as to the custom of a boat of potatoes which is to continue 6d. per boat" (16, p. 453).

The Corporation decided on the 29th June, 1771, that "every boat coming to market with potatoes exceeding 20 barrels, either down the river or from sea, to pay the Waterbailiff his ancient fee of 6d., and the Clerk of the Market 6d. This indulgence to serve the poor by encouraging potatoes being brought to market; and not confirmed as a precedent to deprive this Corporation of their accustomed duties" (16, p. 482).

It was resolved by the Corporation at their meeting, 23rd May, 1782, "that a piece of ground be taken for a Root Market" (16, p. 505).

Crofton Croker, in dealing with the history of the potato, writes: "What renders this question" (the introduction of the potato at Youghal) "an object of more than ordinary interest to the Editor is, that in a manuscript among the 'Southwell Papers,' unfortunately without date, but from the contents believed to have been written about 1640, potato-roots are called 'Crockers' from having been first planted in Croker's field at Youghal. Possibly the spot mentioned by Lord Castlhaven who, in his 'Memoirs,' states that when he encamped with the Irish Army before that town in 1645, he caused Major-General Butler to take up a position 'towards the sea near Croker's works'" (21).

All the early references already quoted in regard to the potato in Ireland are admittedly in some degree inconclusive, but from 1654 indisputable evidence exists that the potato was an important article of food in Ireland at that time and must have been so even at an earlier period.

Croker remarks : " That potatoes were ordinary food in the South of Ireland before the time of the Commonwealth is shown by ' An account of an Irish Quarter ' printed in 1654, in a volume entitled ' Songs and Poems of Love and Drollery by T. W. ' (Captain Thomas Weaver). The writer and his friend, two cavaliers, visit Coolfin in the County of Waterford, the seat of Mr. Poer, or Power, the high-sheriff, where their entertainment is thus described :—

" And now for supper, the round board being spred ;

The van a dish of coddled onions led ;

I' th' body was a salted tail of salmon

And in the rear some rank potatoes came on ' " (21, p. 55)

The next reference to the potato in Ireland was made by William Coles. Herbarist—as he calls himself (20). His work, *Adam in Eden*, was published in 1657. As this volume is now very rare the following quotation is given :—

" The Potatoes, which we call Spanish, because they were first brought up to us out of Spaine, grew originally in the Indies, where they, or at least some of this kind, serve for bread, and have been planted in our Gardens, wherein they decay rather than increase, but the soyle of Ireland doth so well agree with them, that they grow there so plentifully that there be whole fieldes overrun with them, as I have been informed by divers Souldiers which came from thence. . . " (20). The " Souldiers' " statements show that the potato was extensively cultivated in Ireland before 1657.

Public attention in England was first drawn to the potato as an important source of food by a Mr. Oldenburgh placing before the Royal Society at their meeting on March 18th, 1663, a letter sent him by Mr. Buckland, a Somersetshire gentleman, wherein was proposed a way of preventing famine by dispersing potatoes throughout all parts of England. The heads of the letter were read, and a committee appointed to consider of all the particulars thereof, and to make a report to the Society.

The Committee recommended that certain measures be taken to popularise the growing of potatoes in England. Mr. Boyle, a member of the Committee, was asked " to communicate to the Society those observations and notes which he had made upon the root, the manner of planting it and the diffusiveness of the seminal virtue thereof."

On April 8th, 1663, Mr. Boyle brought a letter regarding potatoes from his " gardiner," which was ordered to be entered, and is as follows :—

" SIR,

" I have, according to your desire, sent a box of potatoes. My care hath been to make choice of such that are fit to set without cutting, for many that have not small ones enough are constrained to cut the great ones : but I do not approve of that husbandry, neither do I make use of it, because when they are cut the worms do feed on them ; and so devouring the substance, the branch growth the weaker, and the root small. The ground which they thrive best in, is a light sandy earth where

fern or briars do naturally grow. Their nature is not to grow fruitful in a rich soil, because they will spring forth many branches and so encumber the ground that they will have but small roots. You may cause them to be set a foot apart, or something better, whole as they are, and there will be a great increase, and the branch will bring forth fruit, which we call the potato-apple. They are very good to pickle for winter sallads, and also to preserve. I have tasted of many sorts of fruit, and have not eaten the like of that : they are to be gathered in September, before the frost doth take them.

“ If you are minded to have great store of small roots, which are fittest to set, you may cause them to lay down the branches in the month before named, and cover them with earth three or four inches thick ; and the branches of every joint will bring forth small roots in so great a number that the increase of one yard of ground will set twenty the next season : And it must be the care of the Gardiner to cover the ground where the roots are with fern or straw, half a foot thick, or better, at the beginning of the winter, otherwise the frost will destroy the roots ; and as they have occasion to dig out the great roots, they may uncover the ground and leave the small ones in the earth, and cover them as before to preserve seed. Now the season for digging the ground is in April or May, but I hold it best the latter end of April, and when they dig the ground, let them pick out as many as they can find, small and great, and yet there will be enough for the next crop left. Let the covering, which they are covered withal be buried in the ground, and that is all the improvement that I do bestow. I could speak in the praise of the root, what a good and profitable thing it is, and might be to a commonwealth, could it generally be experienced, as the inhabitants of your town can manifest the truth of it, but I will be silent in speaking in the praise of them, knowing you are not ignorant of it ” (7).

Robert Boyle was the seventh son of the first Earl of Cork. “ Your town,” mentioned in the “ Gardiner’s ” letter, probably referred to Lismore, his native town, though Wilde (70) believed that Youghal (14 miles distant) was the town concerned.

This letter is of considerable importance as it shows that the growing of potatoes was well understood in the neighbourhood of Lismore as early as 1663. Evidently in the opinion of the Royal Society there was no district known to them where more reliable information was available.

The first pamphlet dealing exclusively with the potato was published in 1664. The title is rather striking. “ England’s happiness increased, or a sure and easy remedy against all succeeding dear years, by a plantation of the roots called potatoes, whereof (with the addition of wheat flour) excellent good, and wholesome bread may be made every year, eight or nine months together, for half the charges as formerly. Also, by the planting of these

roots 10,000 men in England and Wales, who know not how to live or what to do to get a maintenance for their families, may, of one acre of ground, make £30 per annum. Invented and published for the good of the poorer sorts by John Forster, Gent., of Hanslop, in Buckinghamshire" (29). This pamphlet is extremely rare, but there is a perfect copy in the British Museum where the writer had the opportunity of perusing it. Two pages are devoted to a dedication to "The High and Mighty Monarch Charles the II," two pages to a dedication "To the Reader." There are twenty-eight pages devoted to the potato, with two pages of an Appendix.

On page two it is stated: "Now there are divers kinds of Potatoes, all which were originally brought from *America*. The first sort, being those of greatest request, are the *Spanish Potatoes*, called of the *Latines*, *Battata*, *Camotes*, *Arnotes*, *Ignanes* and *Inhames*. The second sort are the *Virginia Potatoes* called *Battata* and *Battatas Virginianorum*, *Papas*, *Papus* and *Pappus*. The third sort are the *Potatoes of Canada* called of the *Herbarists*, *Heliotropium indicum tuberosum*, *Flos solis pyramidalis*, *Aster peruvianus tuberosus* and falsely in *English Artechocks of Jerusalem*. The fourth sort (which are these I shall write of in this Treatise, and are fittest for our purpose) are the *Irish Potatoes*, being little different from those of *Virginia* save only in the Colour of the Flower, and time of flowering; for these bring forth a white flower about the end of *June* and so continue flowering most part of the Summer: the other (as Mr. Gerard saith) flowreth not till August, and beareth a purple Flower. These Roots, although they came at first from the *Indies*, yet thrive and prosper very well in *Ireland*, where there is whole Fields of them; from whence they have been brought into *Wales*, and into the North Parts of *England*, where they likewise prosper and increase exceedingly." Towards the end of the pamphlet, Forster treats of the "Utilities" of the potato.

"The First Utility . . . First. If it shall please His Majesty to command that there be brought out of *Ireland*, so many of the said Roots, as that (with those which already are to be had in *England* and *Wales*) every man which shall be Licensed by His Majesty to plant of them, may have one Bushel at least to begin his Plantation with."

"The Fourth Utility . . . Fourthly. Poor People may maintain their Families more easily, and live more plentifully than heretofore, but especially in dear and scarce years such as was 1661, these Roots will be a great benefit to them . . . But when these Roots shall once come into use, People will live more happily and plentifully Trading will flourish, and much Glory will redound to Almighty God for discovering so profitable a Secret."

In *An Appendix Touching The Propagation of these Roots by the Seeds*, Forster states: "After I had written this Treatise and fitted it for the Press, I found, that these Roots might be increased by the Seeds or Berries which till then I knew not; for that the year before I took the Seeds out of the Berries, and sowed them, and they never sprang up and therefore I thought that the Seed came not to sufficient Maturity in our Climate" (29).

Forster was the first writer to attach the name "Irish Potatoes" to *Solanum tuberosum*. This name afterwards became common on the Continent of Europe, and is still extensively used in Canada, United States of America, Australia, Argentine and some other countries. Forster's pamphlet adds confirmation to the importance of the position occupied by the potato in Ireland as early as the middle of the seventeenth century.

Sir William Petty, in his work *The Political Anatomy of Ireland*, written 1672 (published 1691), makes several important references to the potato:—"That 6 of 8 of all the Irish . . . feed chiefly upon milk and potatoes," (51, p. 29-30). "Their food is bread in cakes, whereof a penny serves a week for each; potatoes from August till May, muscles, cockles, and oysters, near the sea; eggs and butter made very rancid by keeping in bogs," (51, p. 59).

Petty's statements are further strong evidences of the importance of the potato as a foodstuff in Ireland in his time.

In a small volume entitled *The Present State of Ireland*, published 1673, the writer, in speaking of the "Dyets" of the people, says: "The Common sort of People in Ireland do feed generally upon Milk, Butter, Curds and Whey, New Bread made of Oatmeal, Beans, Barley and Pease, and sometimes of Wheat upon Festivals . . . They feed much also upon Parsnips, Potatoes, and Watercresses. . . ." (2).

Thomas Dineley, in his *Journal* (1681), gives an account of his visit to Ireland in the reign of Charles II and mentions potatoes on two occasions in such a way as to show that they were the mainstay of the poorer people. He says: "wherefore having enough before hand to furnish them with potatoes, milk, and tobacco. . . ." (24).

In *A Chorographic Account of the Southern part of the County of Wexford* written anno 1684: *By Robert Leigh Esq. of Rosegarland, in that County*," the statement occurs, "but ye great support of ye poore sortes of people is thire Potatoes, which are much used all over the County" (43).

Blome, in 1686 writes: "Potatoes. This is a Root in great Request in our American Plantations, as also in Ireland" (9).

The frequent references made to the potato in the satire entitled *The Irish Hudibras*, published 1689, are a further proof of the importance of this plant as a foodstuff at that time.

"No Cannons nor wide-mouth'd Granadoes
Nec's Fire-balls were boil'd Pottadoes:
Pottadoes still did serve, instead
Of Peas and Bacon, Beef and Bread" (1).

Later the arrival of King William does not allow the "hero" to enjoy

"My Banniclabber* and Pottados
Without these French and Dutch Granados."

* Buttermilk

It is further said—

“And here was that prodigious Tooll,
That Monstrous Giant, Finn MacHeuyle
Whose Carcass bury'd in the Meadows
Took up nine Acres of Pottados ” (1).

A great temptation to hungry men is described thus :—

“Over their nose prepared lies
A sumptuous Banquet of great price
Pottados, and a spole of pork
Where Nees long'd sore to be at work ” (1).

And again—

“Bring me a Bunch of Suggane Ropes,
Of Shamroges and Pottado Tops ” (1).

In one passage the writer says :

“Who can forget the Learned Cato
That writ so much on a Pottado ” (1).

Nothing is now known of the “Learned Cato” except that in a note he is described as “Cormack MacArt, styled the Cato of Ireland. He wrote a Treatise of the Virtues of a Pottado, beyond the Wisdom of Solomon, the Knowledge of Aristotle, the Rhetorick of Cicero, Con Clerenaugh, and Mureartagh O Collegan ” (1).

Not much importance can be attached to a production of this kind, though it is undoubtedly evidence that the potato was in common use at that time.

John Dunton, in his *Conversation in Ireland*, published in 1699, describes the Irish cabin in his day as having behind it “the garden, a piece of ground, sometimes of half an acre or an acre and in this is their corn, perhaps two or three hundred sheaves of oats, and as much peas ; the rest of the ground is full of their dearly-beloved potatoes and a few cabbages ” (27).

No reference to the use of potatoes as a food for live stock in Ireland during the seventeenth century has been traced. There can, however, be no doubt but that its use for this purpose was well known. An English writer, Adolphus Speed, made such a reference as early as 1659 to its use in England (60). A few years later another English writer, Worlidge, suggested that they might be “propagated in great quantities for food for Swine or other Cattle ” (71). Many subsequent writers copied Worlidge's statement almost verbatim.

III.—THE POTATO IN IRELAND DURING THE EIGHTEENTH CENTURY.

The importance of the potato increased with the increase of population throughout the century, and the tuber steadily maintained its position as the principal food of the inhabitants.

Prior to 1710, a potato market was established in the City of Cork. At a meeting of the Corporation held in that year "on the petition of Timothy Murphy and others, touching an inconveniency to their houses by the potatoes, Mr. Mayor is desired to consider some fit place for that market and have it be removed from the place where it now is" (15, p. 345).

Threlkeld, an Irish writer, says: "This agreeable Root (for it agrees to Fish, to Flesh, to other Herbs, as in *Cole-canon*, and that either Roasted, Boiled, Parched, Smothered or Fried by it self, or with other Meat) is highly prized by us for its great usefulness in Food, without which innumerable poor must starve, the greatest parts of our Lands being pasturage . . . Dearth of bread can never affect us much while this Crop answers, as it has done this Year 1725" (63). This writer also refers to "our Potato's sold in our Markets," showing that the potato was a common article of commerce.

Rye, as early as 1730, refers to the export of potatoes from Ireland. He says: "The Culture of *Potatoes* is Beneficial for *Ireland*; and the Merchant finds a profit in transporting them to our Garrisons of *Gibraltar* and *Portmahon*, and to some other Parts" (55). He also refers to the fact that in the period of "severe scarcity of Provisions in the first half of 1729," the North of Ireland and Dublin were supplied from County Cork with barley, oats and potatoes. These are the earliest references extant to the export of potatoes outside of South America.

The earliest reference to distinct varieties of the potato was made by Rye in 1730. He says: "There are five sorts of *potatoes* known to us; the white flat Kidney *potatoe*, the round White, the Yellow, the round Red, and the Black *Potatoe*. The white *Potatoe* is set in *January* to afford early *Potatoes* in the latter end of *June*. The round White is neglected. The yellow *Potatoe* is valuable for keeping most part of the *Summer* following. The round Red is a good *Potatoe* and increases much. But it is the Black *Potatoe* (not that the Pulp is black, but that the Skin is very dark) that is most valued by those who know it; the Pulp affords a stronger invigorating Diet to the Labourer; it keeps till *Potatoes* come again . . . Since the people of this country found the peculiar goodness of this *Potatoe*, they will scarce cultivate any other. They will grow so large, as that some of them have measured four inches in diameter" (55).

Switzer, writing in 1727, says: "The great produce and profit that arises from these roots" (potatoes) "cause many fields in and about *London* and the *West* to be planted with them, as well as in *Ireland*, where they are the sole food of many of the natives" (62, p. 219).

In a letter by Lord Primate Boulter, dated February 24th, 1727, at Dublin in support of a Tillage Bill, the passage occurs, "As the winter subsistence of the poor is chiefly potatoes, this scarcity (of corn) drove the poor to begin with their potatoes before they were full grown, so that they have lost half the benefit of them, and have spent their stock about two months sooner than usual" (10).

K'Eogh in his *Irish Herbal* (1735) referring to the potato, says : "They are a very nourishing healthy food, which appears by the strong heat and robust constitutions of a vast number of the natives who are almost entirely supported by them. They are Analeptic, Diuretic and Spermatogenetic" (41). According to Thomas Hale (1746), "It (the potato) is in a Manner the Food of the common People of Ireland and is cultivated in Lancashire and some other parts of England in vast Quantities" (34).

Dr. Pococke, during his tour in 1752, when visiting North Mayo, records that "their food chiefly oat cakes baked on the griddle and potatoes with their butter milk" (53, p. 87). Later, when he had reached County Wexford and, dealing with the famous baronies of Forth and Bargie, he says : "In Bargie, which is not altogether so populous, there is a greater appearance of wealth ; notwithstanding in Forth they live as neat as can be on such small farms and keep all clean about 'em, their food is Potatoes, barley bread, Bacon, cheese and milk" (26, p. 147-8). Dungarvan, according to Pococke, is famous for an export of potatoes to many parts of Ireland (53, p. 141). It is rather remarkable that this is the only occasion on which he refers to an export of potatoes.

Irwin, in 1764, says that the potato "has become the staple of their support and that they (the Irish) have been the first people in Europe or, perhaps, in the world, that have led the example in an extensive improvement of it" (39).

Mills writes in 1767 : "As Ireland is famed for its crops of potatoes ; as the culture of this plant has been longer and more universally practised there than with us, or any other European nation, and as the Irish have always, very judiciously, looked upon this article as an object of great importance ; it may naturally be supposed that their husbandmen excel in this respect" (47).

Varley, one of the most practical of the agricultural writers of the century and a man well acquainted with this country, repeatedly refers to the importance of the potato. He states that "oats being so general a crop in Ireland one might expect them to be very cheap ; but, however, though a great many are grown, there is also a great consumption as all the poor in general eat no sort of bread except that made of oats ; and the time of the year when potatoes are out of season their whole living is oat-bread and butter-milk, but so long as potatoes are good they supply the place of bread ; therefore oats bear a better price than could be expected, being so general a crop" (67).

A writer in 1771, who hides his identity under the title of *A Practical Farmer*, refers to the nutritive qualities of the potato. "Neither is the potato less friendly to beauty than productive of vigour; for among the healthy progeny that crowd the cabins of these mean people, as well as among the numerous little ones that fill the cottages in Lancashire, where, next to Ireland, the potato is most generally used as food, the admirable complexions of the wenches are so remarkably delicate, as to excite in their superiors very friendly and flattering sensations" (35). The same writer says: "In the neighbourhood of London so great a quantity is raised annually as to fill the markets even to profusion. More to the south, in Cornwall and Wales, the potato is rather confined to the garden than introduced into the field culture. In the north it is quite the reverse. In Ireland they are cultivated for a staple and in Scotland now more than ever" (35).

Twiss made a rather extensive tour in Ireland in 1775. He says: "There is generally a small piece of ground annexed to each cabin, which produces a few potatoes and on these potatoes and milk the common Irish subsist all the year round" (66). The same writer states that even with the Irish gentry "potatoes form a standing dish at every meal" (66).

Arthur Young made his tour of Ireland during the years 1776-1779. The importance of the potato in Ireland as compared with England at that period is shown with remarkable impressiveness in Young's writings. In his *Six Weeks' Tour* and his *Eastern Tour* the potato is seldom mentioned, while, even in his *Northern Tour*, though the potato takes a slightly more prominent position, a reader could be excused for overlooking the existence of the potato in England. On the contrary, in his *Irish Tour*, the potato is continually mentioned. Young is the outstanding agricultural writer of the century. His detractors like to point to the fact that he was not a very successful practical farmer, but whether this be so or not, his literary works are invaluable records of agricultural conditions. His *Irish Tour* gives a clearer insight into Irish agriculture at the time than can be found elsewhere.

It is a common opinion that poverty alone drove the Irish people to a potato diet. Poverty quite as desperate, if not even more so, existed in other countries where the potato, although known, was not cultivated to anything like the same extent. It would appear that, in the eighteenth century especially, the Highlands of Scotland were in no better condition. In the statistical Account of Walls in the Orkneys, the author speaks thus of the *shealings*: "Their household furniture must be described negatively—no bed, no table, no chair. These the Highlander does not reckon among the necessities of life, as he can make the earth serve him for all three. In his shealing, composed of earth and a few sticks, you find no other furniture than a few dishes for his milk and a bowl for his meal."

The real reason why the potato became an important food in Ireland at an early period was, as writers such as Coles, Petty, Forster and Houghton pointed out, that the climate and soil suited the plant so well that good crops could be grown with little effort. Young's remarks in this connection

may be quoted. "The food of the common Irish, potatoes and milk," he says, "have been produced more than once as an instance of the extreme poverty of the country; but this, I believe, is an opinion embraced with more alacrity than reflection. I have heard it stigmatised as being unhealthy and not sufficiently nourishing for the support of hard labour, but this opinion is very amazing in a country, many of whose poor people are as athletic in their form, as robust and as capable of enduring labour, as any upon earth. The idleness seen among them when working for those who oppress them is a very contrast to the vigour and activity with which the same people work when themselves alone reap the benefit of their labour. To what country must we have recourse for a stronger instance than lime carried by little miserable mountaineers thirty miles on horses back to the foot of their hills, and up the steeps on their own. When I see the people of a country in spite of political oppression with well formed vigorous bodies and their cottages swarming with children; when I see their men athletic and their women beautiful, I know not how to believe them subsisting on an unwholesome food" (72, Part II, p. 23).

Many important quotations from Young's work must be passed over, but the following may be included:—"I think £5 10s. 2d. for liberty to plant a crop as beneficial to the land as potatoes, a very extravagant rent (usually charged by farmers to labourers, etc.) and by no means upon a fair level with the other circumstances of the poor. The prime cost of two shillings and sevenpence halfpenny per barrel generally of twenty stone, being equal to about eightpence the bushel of seventy pounds, is not a high price for the root, yet might it be much lower; if they gave up their lazy-bed method of culture and adopted that of the plough, for the average produce of three hundred twenty eight bushels, or eighty two barrels per acre, compared with crops in England is perfectly insignificant, yet to gain this miserable produce much old lay and nineteen twentieths of all the dung in the kingdom is employed" (72, Part II, p. 22).

Again he says: "When, however, I speak of potatoes and buttermilk being the food of the poor, the tables already inserted shew that in some parts of the north that root forms their diet but for a part of the year, much oatmeal and some meat being consumed. I need not dwell on this, as there is nothing particular to attend to in it, whereas potatoes, as the staple dependence is a peculiarity met with in no country but the other parts of Ireland" (72, Part II, p. 25).

Bryant, the author of what is probably the earliest history of esculent plants, states that "The Irish seem to have been the first general cultivators of it (the potato) in the western parts of Europe, and it is so extended now as to form a principal part of the winter food both of the Irish and English" (13).

In 1790 Birch stated: "England and Ireland, these former asylums of liberty of every kind, afforded the persecuted potatoe a sanctuary. In the latter it soon acquired a perfection it had never known before and it became

part of the diet of the rich and the whole diet of the poor ; nor was this all, it became an article of commerce and was soon known and admired in every part of Europe, by the name of the Irish potatoe ; a name which it deservedly obtained, and maintains to this day, from the pre-eminence which the Irish nation has obtained in the method of cultivating it " (8).

Authorities could be multiplied, but sufficient evidence has been produced to show that, all through the eighteenth century, the potato remained almost the sole support of the poorer classes and an important part of the food of the wealthier people in Ireland.

It is rather remarkable that not once throughout the century, not even by Young, does there appear to have been a warning note sounded of the danger of a whole nation depending to such an extent on one plant. True, there were periods of scarcity, but usually the crop in the following season made amends and matters proceeded as before. Indeed, the Board of Agriculture, established in England late in 1793, set up a Committee who prepared in 1795 an admirable Report concerning the *Culture and Use of Potatoes*. In the introduction to the Report it is stated : " Early in the Spring of 1795, the Board of Agriculture took into its consideration the dearness of provisions ; and among the various ideas which were with the most patriotic views expressed on that occasion, none seemed to merit so immediate an intention as to encourage by such means as were in the power of the Board, a more extensive cultivation of Potatoes." This Report referred, of course, only to Great Britain ; but the Committee must have been impressed, at least to some extent, with the food-producing power of the Potato in Ireland.

The century closed with no abatement in the popularity of the potato, and with the whole population as dependent on it as ever.

References to the use of potatoes as a food for live stock during the eighteenth century are not numerous, but those available show that the tuber was used to a large extent. Young gives a realistic account of the liberal manner in which potatoes were eaten by the people and fed to live stock. (72, Supplement, p. 24).

IV.—THE POTATO IN IRELAND, 1800 TO 1845, WHEN " THE DISEASE " APPEARED.

As already shown, the potato was the principal food of the people during the eighteenth century and continued to gain rather than lose in importance throughout that period.

From the opening of the nineteenth century, reliable records of the real conditions of affairs become more plentiful. Among such records priority must be given to the series of Statistical Surveys of twenty-three counties, unfortunately never completed, published under the auspices of the Dublin Society, which became the Royal Dublin Society before the last volume was published. The Surveys were modelled on the plan instituted in Great Britain by Sir John Sinclair, first President of the Board of Agriculture.

Numerous passages from the Surveys might be quoted, but the following extracts will suffice to show the position occupied by the potato at that time.

In the County Cork Survey, the writer states: "Within this period (1780-1810) general appearances would induce one to believe that the increase (in population) here has been fourfold at least. For this rapid augmentation the following causes may be assigned: increased industry, facility of subsistence, the custom of marrying at an early age, and the happy use of inoculation for small-pox.

"Among the articles of Irish subsistence, the great staple commodity is potatoes, which now make the principal part of their food for the whole year. Formerly the use of them was limited to particular seasons, oatmeal having been used in spring and summer" (63, p. 88).

In the County Kilkenny Survey, probably the most complete work of the series, the writer states that "all the dung of the country besides other manure goes to raise potatoes" (64).

"Potatoes with milk, as often as it can be procured, form almost the whole of the food of the poorer classes in this parish: before the introduction of the kind called the apple potatoe, a great portion of the sustenance of the poor here consisted of oaten bread and milk; from April to August barley bread was sometimes used, and in the hilly parts of the parish, rye bread; but since the cultivation of the apple potatoes has become general, the poor continue to eat them until the new potatoes come in" (64, p. 479).

In County Tyrone, "Potatoes and oatmeal are the chief articles which compose the poor man's food the year round" (45). In County Down "*Provisions*---Are Potatoes, oatmeal boiled and baked, with milk and butter in summer and some bacon" (26). In the baronies of Forth and Bargie, County Wexford, the writer of the Survey of that County says: "The inhabitants do not live entirely on potatoes, as in many other parts of Ireland. They have always oatmeal boiled with milk for breakfast, and meat for their dinner twice a week, that is on Sundays and Thursdays, and very often on Tuesdays" (28, p. 71-2). "*Potatoes*---This useful plant is in this county as in most other parts of Ireland the chief food of the inhabitants, and they, therefore, apply all the dung they can collect to this crop. We have mentioned above that in the southern district the inhabitants do not live wholly on potatoes, but make use of oatmeal stirabout for their breakfast, and often barley bread with milk. They have generally meat also twice a week, but in other parts of the county they generally have potatoes three times a day as long as they last, which in good years is generally until the new potatoes come in" (28, p. 96).

In County Sligo the food was "Chiefly, almost entirely potatoes, with some oaten bread, flummery, milk, eggs, butter, but mostly fresh or dried herrings and other sea-fish" (46, p. 71).

It is not necessary to go beyond the Surveys to understand the position occupied by the potato at the opening of the nineteenth century, but the authors of the Surveys did not draw attention to the risk involved in so much dependence being placed on this root.

The century was not very far advanced, however, when Edward Wakefield paid a two-years' visit to this country, and recorded his experiences in two substantial quarto volumes. Next to Young's, his work is the most valuable account available of rural conditions in Ireland in the period dealt with. He wrote about thirty years later than Young, and during that time the population had continued to increase by about one forty-sixth each year, reaching by Wakefield's time to about 6,000,000 (22, Vol. I, p. 109).

Like Young, Wakefield was most impressed throughout his whole tour by the extent to which potatoes formed the food of the inhabitants.

Young, though inclined to think that it encouraged laziness, never condemned the potato. Wakefield, however, expressed some doubts as to whether the potato was an unmixed blessing, and he may be credited with being the first person, at least certainly the first person to place on record, the dangerous position in which the country stood through its exclusive dependence on the potato. He pointed out the drawbacks of this crop and blamed the potato, or rather the too extensive use of the potato, as being the cause of the very minute division of the land. His words are : " Although I will not venture to assert that the general use of potatoes, as food, is in Ireland the only cause of these minute divisions of property, it has had no small share in producing them " (68, Vol. II, p. 723). " This minute division of the soil," he continues, " which, were some other general article of food substituted for the potato, could not take place, habituates the people to rely upon a small patch of land for their subsistence, a partial failure of the crop produces a local famine." Wakefield raised other objections to the " potato system "—that the crop could not be held over, so that the deficiency of one year could be made good by the superfluity of another ; that, although the potato could probably feed more people than wheat, yet the surplus left over after feeding those necessarily engaged in the cultivation of potatoes and wheat, would not, in the balance, favour the potato ; and that the greatest drawback on potatoes as food for the inhabitants of a country is that in no crop is there a greater difference, in good and bad years, as to the quantity produced. Later events bore out his views.

Soon after Wakefield's work was published, this country was visited by J. C. Curwen, Esq., M.P., himself a very extensive farmer and one of the largest potato-growers in England at that time. He, too, was greatly struck by the predominant position of the potato (22, Vol. I, p. 107) and was even more impressed than Wakefield at the risk the country was taking in placing so much reliance on one crop. He writes : " A failure in the potatoe crop, which Heaven avert ! would nearly absorb the whole resources of the country to subsist its population ; which at the best of times is burthensome, but by

such a casualty may become destructive" (22, Vol. II, p. 42). Curwen correctly pointed out that "the potatoe which, in some points of view, may justly be regarded as one of the greatest blessings to our species, is capable of operating the greatest calamities, when it exclusively furnishes the food on which the community is content to exist" (22, Vol. II, p. 121).

Despite occasional partial failures, the potato held its position of popularity. Referring to openings for agricultural improvement the *Munster Farmers' Magazine* states: "none can be deemed of superior importance, and very few can even be put in competition with potatoes." Further on in the same article it is stated that potatoes are "the chief cause of our population and our greatest security against famine" (49, Vol. I, p. 46). The Magazine also comments that potatoes were much used as a food for live stock, that cattle and sheep thrive well and fattened quickly thereon, and that potatoes were also fed with advantage to horses (49, Vol. II, p. 261).

The potato was seriously assailed by Cobbet in his *Rural Rides* (19) and other works, but without result. In his *English Gardener* he writes: "Potatoe—I am going to speak here of this vegetable as a thing to be used merely in company with meat and not to be used as a substitute for bread . . . to raise potatoes for the purpose of being used instead of bread, is a thing mischievous to the nation" (18).

Another noted traveller, J. N. Brewer, who visited Ireland in 1824, frequently refers to the potato. "Potatoes constitute so important an article of Irish produce that they demand more than a cursory notice . . . It appears that potatoes were largely cultivated in Ireland before they were known in Britain, and they speedily became the staple dependence of the labouring classes. That they still contrive to form the principal, or sole, diet of the same order of people is noticed in other pages, and is a circumstance peculiar to this populous island" (11, Vol. II, p. cxliv.). He also comments on the very minute division of the land, though he does not blame the potato for this. He says: "The small farmers, having rarely money to bestow, commonly make a partition of lands on the marriage of a son" (11, Vol. II, p. cxxxviii.).

Though further references are scarcely necessary to show the predominance of the potato, two quotations from Lambert deserve to be included. He says: "There are some wet lands in Ireland well adapted to the growth of beans, and we stand much in need of green crops as rotation and ameliorating ones; but the potato, by its superior value and general utility, seems to have set aside the desire almost entirely of cultivating any leguminous or other green crop, and when we consider that on it the poor man not only feeds himself and his family, but his cow, during the winter, his pig and his poultry, as well as his horse or mule occasionally, it is not to be wondered at that he should have such a predilection for his favourite root" (42, p. 122).

And again—"This country, so peculiarly adapted to this esculent, from the moisture of its climate and its generally dry, loamy, sandy, light and

vegetable soils (strong clays being uncommon with us, which are unpropitious to its growth), cannot be accused of not having availed itself of all advantages, as it has pushed the culture of this root farther than any other on the globe. There is no country either in which it is produced in the same perfection, and now that it has taken such root in our soil, and has become, it may be said, irrevocably the food of the people, its culture can hardly be too extensive . . . Notwithstanding all the arguments of its decriers, it is one of the greatest enrichers of the soil and it is capable of nourishing a wholesome and hardy race. It has been argued this valuable root, by the facility it affords of obtaining a livelihood, has been the chief cause of the great *imagined* evil of Ireland—*excess* of population. I will admit that among other causes it may have added to our numbers ; but that those numbers are not excessive, I will endeavour to prove elsewhere, and as the most romantic theorist could not think of effecting a change in, or affording a substitute to Pat for his vegetable diet, a more extended culture of them should be encouraged, and, at the same time, *too minute* a division of the lands prevented. Moors, mountains and wastes should be reclaimed ” (42, p. 123-4).

Conditions appear to have gradually worsened owing to the continued rapid increase in the population without any improvement in the conditions of employment. In 1845 the population was estimated at 8,295,000 (33).

In 1845, potato blight, later known as “ the disease,” made its first effective appearance in Ireland, and in the following year, an earlier and much more severe attack caused the partial, and, in some districts, the complete destruction of the potato crop, resulting in the worst famine recorded in Irish history.

From that date the modern development of the potato may be said to have begun, and a new chapter in the history of the potato opened.

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SAORSTÁT BUTTER TESTING STATION.

The Saorstát Butter Testing Station, which was established by the Department of Agriculture in the year 1926, comprises a Butter Examination Hall, Chemical and Bacteriological Laboratories, a cold store, engine and boiler rooms and office accommodation for the technical and clerical staffs.

The Butter Examination Hall, which is a capacious, well-lighted room, 78 feet long by 44 feet wide, is used principally for the holding of Surprise Butter Inspections, the nature and object of which are described below. This hall is equipped with an air conditioning and cooling plant capable of eliminating 72,000 B.T.U. by air circulation, by means of which the temperature of the hall can be kept between 50°F and 60°F.

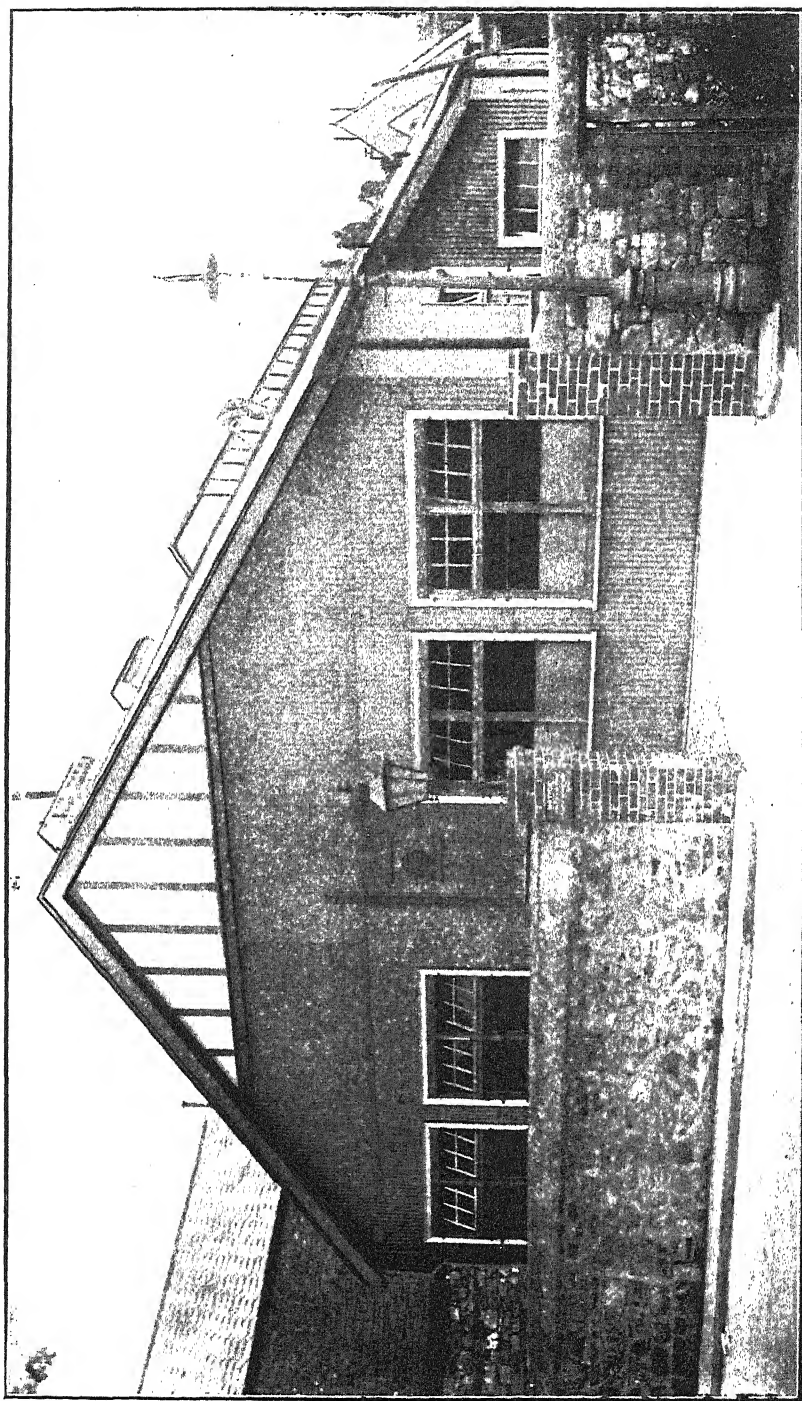
One end of the hall opens into the chemical laboratory and the other into the bacteriological laboratory. The laboratories are fully equipped with up-to-date apparatus and appliances for the analysis of all classes of dairy produce and of the various materials and ingredients used in connection with the production thereof.

The cold store consists of two apartments each of 1,600 cubic feet capacity. These apartments are entered from the judging hall, through a chilled passage which serves as an air-lock to protect the chilling rooms themselves from undue rise in temperature when their doors are opened. At the rear of the cold store are an engine room and a boiler room. The former houses the machinery necessary for operating the air cooling plant in the examination hall and for chilling the cold store. There are two refrigerating machines, each of which is coupled direct to a 20 B.H.P. motor. The cooling of the chilling rooms is done by direct expansion of ammonia, the piping being arranged in circuit. The rooms can be kept at from 0° to -10°F with the air-lock passage at 20°F. Each of the refrigerators is capable of producing 6 tons of ice every twenty-four hours. The boiler serves a central heating and hot and distilled water system for the laboratories and the office.

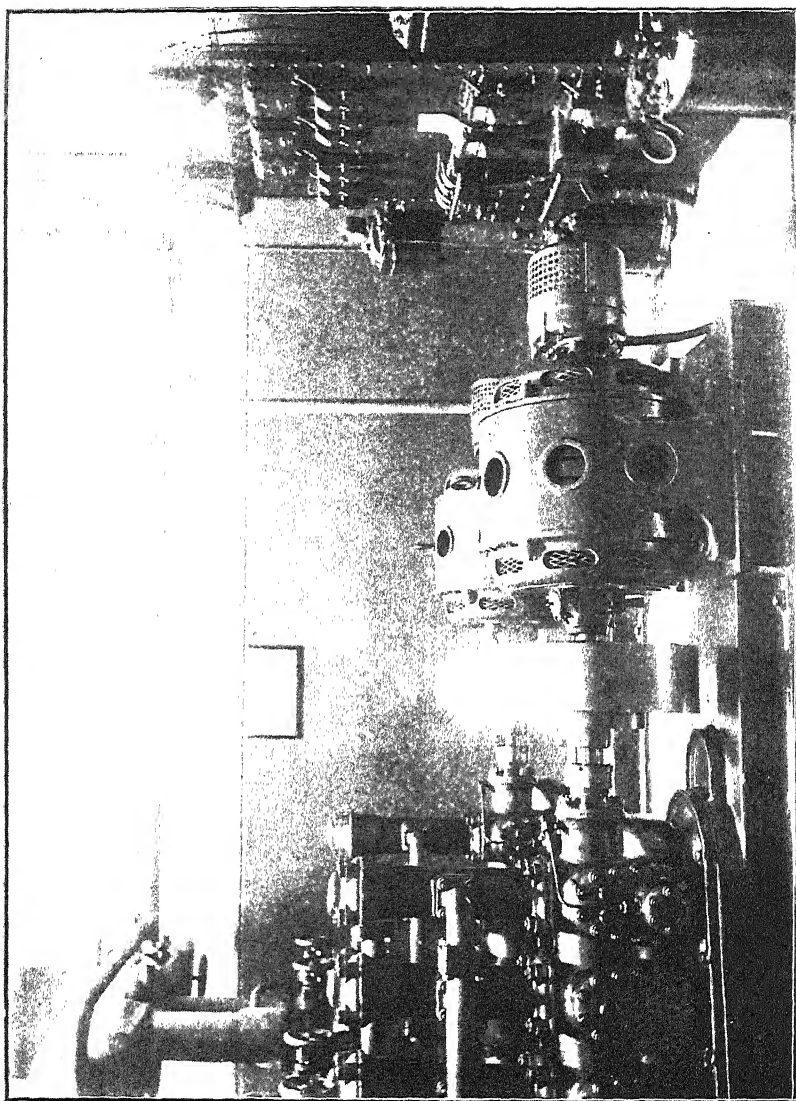
The work of the station may be broadly classified as follows :—

Each creamery is visited periodically by the local dairying inspector, who seals a package selected at random from the butter in stock and arranges for its despatch to the Butter Testing Station. Each package is retained at the station under ordinary commercial conditions for a period of not less than ten days before being judged. Marks are awarded for flavour, texture, colour, and packing and finish by three judges, each acting independently. Particulars of the marks awarded and of any comments made by the judges are furnished to the creameries concerned when the packages are being returned, so that the creameries may be in a position to examine the butter in conjunction with the marks awarded and in the condition in which it would normally reach the consumer in the ordinary course of trade. The butter is also analysed for salt and water content,

**Surprise
Butter
Inspections.**



Butter Testing Station — Exterior



Refrigerating Plant

and for yeast and mould infection, the results of these analyses being likewise communicated to the creameries, together with the pH value of the butter. The pH value indicates the degree of freshness of the cream used in the making of the butter, while the examination for the presence of yeasts and moulds enables an idea to be formed of the degree of cleanliness exercised in the course of manufacture.

Inspections are held at least once a month, except during the winter months, and at each inspection samples from all the creameries are examined. An average of about 180 samples is examined at each inspection. Over 90 per cent. of the samples attain the standard of choicest butter.

The Sir Alfred Read Perpetual Challenge Cup is awarded each year to the creamery manufacturing the highest quality butter as determined by the results of the Surprise Inspections held during the previous year. The conditions attaching to the award of the Cup are very stringent. For instance, no creamery is eligible if any sample forwarded by it contains more than 16 per cent. of water or falls below the standard of choicest butter in flavour or texture, or if the proprietor is convicted of any offence under the Dairy Produce Act, 1924, or Regulations thereunder, or if a Notice has had to be served under the Act requiring the plant, machinery or appliances at the creamery to be cleansed. The creamery which does not contravene any of these conditions and which secures the highest average mark at the inspections is awarded the Cup, and presented with a certificate. Medals are awarded to the manager and the head buttermaker of the creamery.

In addition to the various analyses of samples of the butter forwarded to the Surprise Inspections, as already described, the
Laboratory normal work undertaken in the chemical and bacteriological
Work. laboratories includes the following :—

- (a) Determination of the water content of samples of butter taken by inspectors at the ports or in course of transit. Where any sample is found to contain water in excess of the prescribed legal limit, namely 16 per cent., appropriate action is taken against the producer concerned.
- (b) The systematic bacteriological and chemical analysis of the water supplies at creameries for the purpose of determining their suitability for use in the manufacture of dairy produce. To a somewhat smaller extent, similar analysis are made of the water supplies at cream-separating stations.
- (c) The regular bacteriological examination of samples of cream taken by inspectors at creameries, with the object of checking the cleanliness of the premises and of the milk supplies and the efficiency of pasteurisation.
- (d) The bacteriological examination of samples of the starters used in the manufacture of cheese.

- (e) Miscellaneous analyses sometimes carried out in series, sometimes individually, as the case may require.

These include the following :—

- (1) Determination of the fat content of samples of cream.
- (2) Analysis of samples of cheese with a view to securing the adoption of improved methods of manufacture.
- (3) Analysis of various milk products or foods containing milk products, such as milk powder, malted milk, patent milk foods, milk chocolate etc.
- (4) Analyses of vegetable parchment intended for use in the lining of butter packages and of miscellaneous materials used at creameries, such as salt, paraffin wax, chemicals for milk testing etc.

The total number of samples of all descriptions analysed per annum is about 9,000.

Apart from the ordinary laboratory work detailed above, research work and special investigations are undertaken from time to time with a view to collecting information of assistance to manufacturers of dairy produce and determining the best methods of dealing with our particular problems.

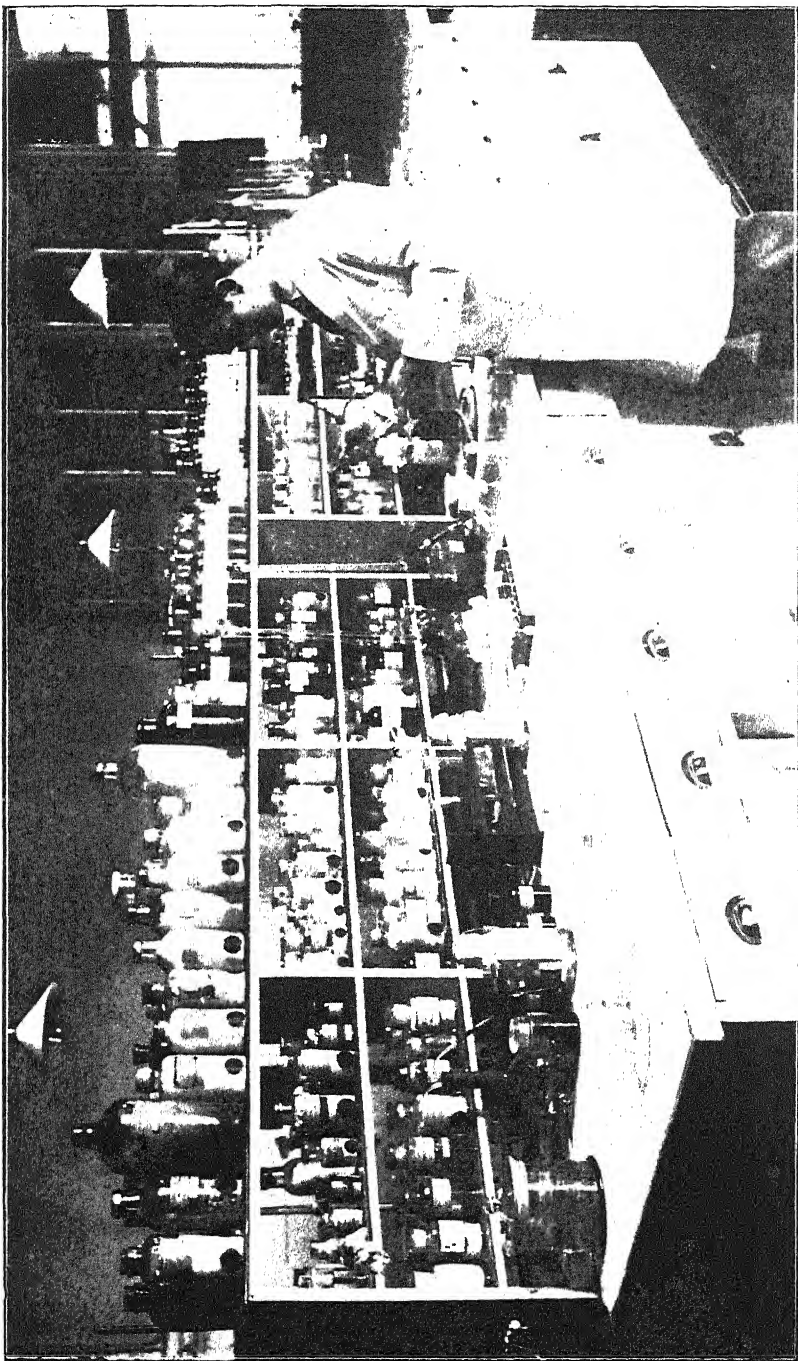
**Special
Investigations.**

In cases where the results of these investigations have been considered to be of sufficient general interest, articles dealing with them have been published in the Department's Journal, and where thought necessary the articles have been reprinted separately in pamphlet form. In some cases it was thought desirable that reports on special work should also be published in other technical journals in order that they might reach a wider scientific public; thus, papers dealing with the composition of Irish winter butter, and with the chemical and bacteriological standards for vegetable parchment used for wrapping butter and other dairy products, have been published in "The Analyst."

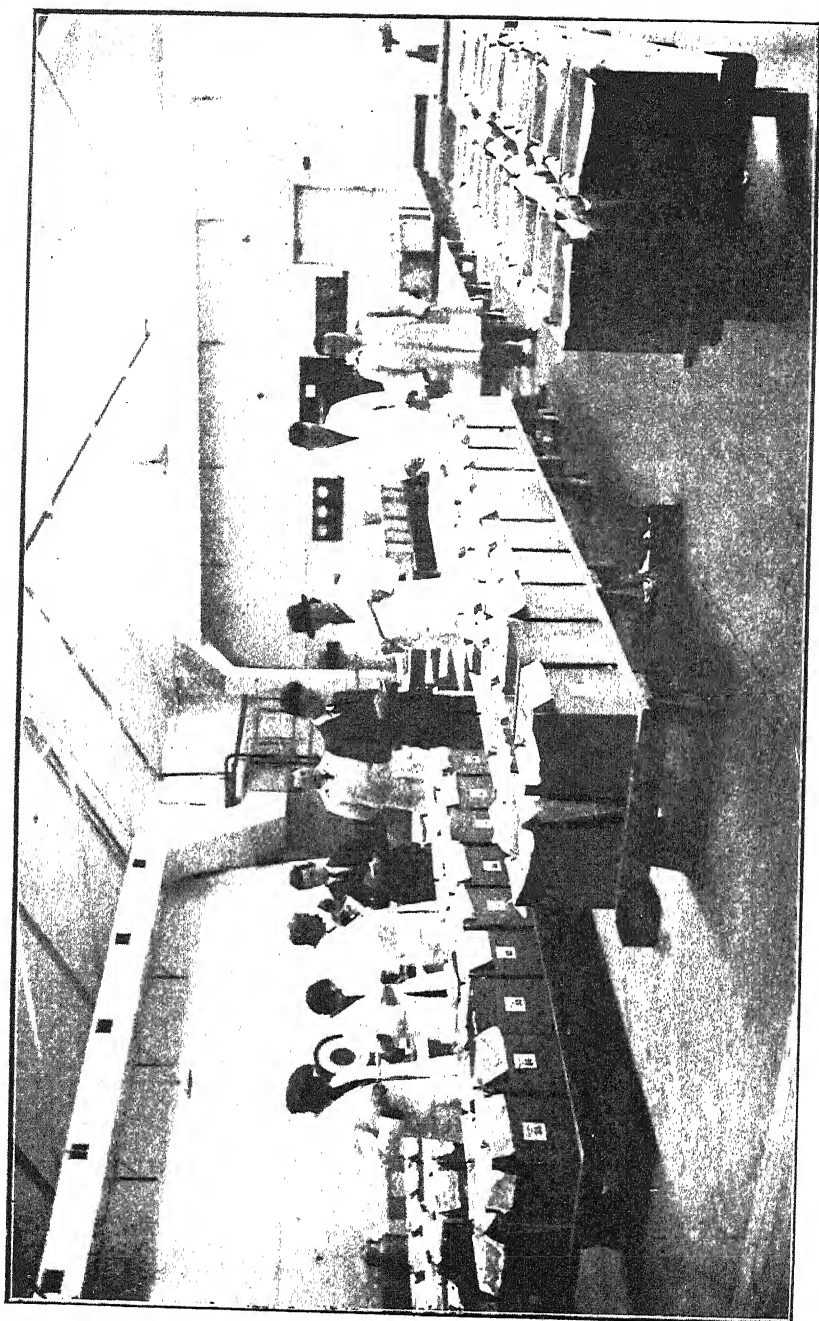
A constant scrutiny is made of British, American, German, French and Danish scientific publications in order to keep in touch with the latest developments in dairy research work abroad, so that up-to-date information can be applied in the examination of the technical problems of the Saorstát dairying industry.

The following is a list of publications dealing with some of the investigations carried out :—

- (a) "Validity of the common tests for purity as applied to Irish Winter-made butter, 1927-28" (Department's Journal, vol. xxix. No. 2, p. 236, and "The Analyst," 1929, p. 634).



A Corner of the Laboratory



Surprise Butter Inspections—Judging

- (b) "The Examination of Vegetable Parchment for packing Dairy Products" (Department's Journal, vol. xxxi., No. 2, p. 282, and "The Analyst," 1931, p. 149).
- (c) "Investigations to test bacteriologically and chemically the effect of cold storage on the keeping qualities of Irish Free State Creamery Butter" (Department's Journal, vol. xxxi., No. 2, p. 179, and vol. xxxii., No. 2, p. 257).
- (d) "The selection of Irish Free State Creamery Butter for cold storage" (Department's Journal, vol. xxxiii., No. 1. p. 23).
- (e) "Rate of Growth of Micro-organisms in Irish Free State Creamery Butter" (Department's Journal, vol. xxxi., No. 2, p. 226).
- (f) "The Bearing of Hydrogen-Ion Concentration on the Flavour of Irish Free State Creamery Butter" (Department's Journal, vol. xxxii., No. 2, p. 273).

As the subject is one of special interest, and in order to illustrate the type of investigation carried out, it may not be out of place to give here a brief résumé of the first-mentioned publication. A feature of Irish Winter-made Butter is that it often shows a content of volatile fatty acids, as measured by the Reichert and other values, somewhat below the normal figures. In some instances the low figures for Irish butter have been interpreted by analysts as indicating that the butter was adulterated. Samples of the cream intended for buttermaking were, therefore, taken at the creameries by the Department's Inspectors, under conditions which left no doubt as to their genuineness, and the fats of these samples were subjected to analysis at the Butter Testing Station. In order that it could be demonstrated clearly that the fall in the analytical values was due to natural conditions, sampling and analysis of the cream was commenced in late autumn and continued at regular intervals until the early spring, the investigations extending over a number of years. In this way analytical figures have been collected which enable it to be proved that genuine Irish winter-made butter can show Reichert and other values below the normal figures for genuine butter. The work of accumulating these results is now nearing completion.

The practical value of these investigations was demonstrated during the year 1933, when the French official food controlling analysts reported that some samples of Saorstát winter-made butter were adulterated, this conclusion being based chiefly on the low Reichert values of the samples. As a result of this report the importation of Saorstát butter into France was temporarily prohibited. On their attention being drawn, however, to the published results of the investigations mentioned, the French authorities were satisfied that the samples were, in fact, genuine butters. The publication of the results has, no doubt, been instrumental in preventing similar action on other occasions, as complaints of this kind in recent years have practically ceased.

FINAL FRUIT CROP REPORT, 1936.

WEATHER.

Although wet and harsh cold periods were frequent and prolonged from early spring until late autumn, the weather in general in Saorstát Éireann was not unfavourable during 1936 for the growth of hardy fruits. January and February were both wet months, and though there were only very light frosts, the weather remained cold and the growth of all plants was much retarded. The months of March, April and May were dry, harsh and cold, especially at night, and this further checked the growth of plants. The result was that the flowering and fruiting periods of fruit trees and bushes were delayed by about a fortnight beyond their normal times. On the whole, however, the weather conditions were not severe enough during the spring and early summer to cause much damage to flowers and young fruits, except in Counties Cavan, Clare, Galway, Kildare, Offaly and Sligo. July of 1936 will long be remembered as the wettest for a number of years, as more than 5 inches of rain fell in many parts of the Saorstát during the month.

During early and mid-May ground frosts caused a little damage to strawberry flowers in Co. Dublin; and in Counties Cavan, Clare, Kerry, Longford and Wexford they caused much damage to gooseberries.

In Co. Cork the weather was favourable at the flowering period, there being no heavy frosts. The period end of May and early June was too dry for small fruits, especially strawberries.

In Laoighis the spring was very severe, especially when the trees were in blossom, and the long drought and cold harsh winds between 23rd March and 18th June injured much fruit.

In Co. Mayo it was a trying season; wintry conditions in April, May and June affected fruit blossoms and reduced the prospects of a good crop.

In Offaly and Tipperary the weather was the worst for many years, cold, frosty nights continuing until the 5th June, and the autumn was marked by very cold and wet rains.

In Wicklow conditions were most unfavourable, being very cold when the apples were in flower; May was too cold and dry, and July and August were too wet, which caused much damage to soft fruit, especially strawberries.

The cold, wet and sunless period during the swelling and ripening of the apples and pears prevented the fruits from growing and developing to their usual size and appearance.

In May there was a slight drop of small fruits on apple and pear trees, bearing heavy crops. There was very little wind damage in general in the autumn, owing to the absence of autumnal gales, which usually cause so much damage at this period.

APPLES.

The crop was a good average one, only 43 crops out of the 133 reported upon being below average.

The cold spring retarded the growth of the trees so much that they did not open their blossoms for from fourteen to twenty days later than usual and as the cold weather continued during the flowering period many of the flowers failed to set their fruits. This was especially the case where trees had borne a heavy crop the previous year. Unfavourable weather continued during almost the whole of the growing season, with the result that a very large percentage of the fruit did not develop to normal size, nor did colour develop as well as in previous seasons. Poor colour was more noticeable in the dessert varieties, which were below average in both appearance and flavour. This was especially the case with early dessert varieties such as Beauty of Bath, Mr. Gladstone, Lady Sudeley and Worcester Pearmain. Of the cookers, Grenadier and Bramley's Seedling were much below their usual size.

What is known as "The June dropping of the small fruits," which occurs on trees which are bearing a very heavy crop, was little in evidence this year.

Allington Pippin was outstanding amongst the dessert varieties. It set well, the fruits developed to a good size and the colour and flavour were well up to the average. The variety Charles Ross also did fairly well, especially in sheltered situations, producing good crops of well-coloured and good-flavoured apples, many being too large for dessert purposes.

Of the cooking varieties, Bramley's Seedling bore the heaviest crops, and Grenadier and Newton Wonder also cropped well.

In Co. Carlow there was a full crop of Bramley's Seedling, but dessert varieties were poor.

It was not a good apple year in Co. Clare, especially as regards the choice dessert varieties which usually do so well in that county.

In Counties Cavan, Laoighis, Longford, Offaly, Sligo and Waterford the crop was the worst for years, and the fruit was not of high-grade quality. The dessert varieties such as Beauty of Bath, James Grieve, Mr. Gladstone and Worcester Pearmain were particularly poor in these counties.

In Cork the yield was good. The fruits were smaller than usual and matured better on the heavy than on the light soils. Of the dessert varieties King of the Pippins, Allington Pippin, Blenheim Orange, Laxton's Superb and American Mother cropped well.

The crop in Co. Dublin was, on the whole, satisfactory, and the fruits were of good quality, especially Bramley's Seedling, Grenadier, Lord Derby, Warners King, Ecklinville and Early Victoria. The best desserts were Worcester Pearmain, Beauty of Bath, James Grieve, Allington Pippin, Ellison's Orange, Lady Sudeley, Charles Ross, Rival and Cutler Grieve.

There was a fairly good crop in Co. Galway, especially of Bramley's Seedling, Crimson Bramley and Golden Spire amongst the cookers, and of Allington

Pippin. Lady Sudeley, Worcester Pearmain and James Grieve amongst desserts. The fruits on Beauty of Bath set well, but the majority of them dropped off before they were ripe.

The yields in Cos. Kildare, Kilkenny, Limerick, Mayo and Roscommon were very uneven. In some orchards there were good crops, whilst in others the trees bore very little fruit, and that of poor quality. In Co. Mayo, though some of the young orchards had good crops, the old orchard trees bore very poorly.

In Co. Meath the yield was good in general, especially with Bramley's Seedling, Lane's Prince Albert, Lord Derby, Grenadier, Newton Wonder and Early Victoria amongst the cookers. The best dessert varieties were Charles Ross, Allington Pippin, Worcester Pearmain, Beauty of Bath and Lady Sudeley.

The prospect in Co. Monaghan when the trees were in flower was very good, but the frost and harsh cold winds in June practically ruined the crop.

In North Tipperary the yield was below the average in quantity, appearance and size. Some of the orchards promised well, but later, unfavourable weather conditions prevented the fruit from maturing properly.

In South Tipperary the yield was good, and the dessert varieties, especially Allington Pippin, Beauty of Bath, Charles Ross and Worcester Pearmain, were of good size and well coloured. Of the cookers, Grenadier, Golden Spire, and Royal Jubilee bore large clean fruit, but those of Bramley's Seedling and Newton Wonder were small in size and of poor colour.

In Waterford the crop was very irregular, some orchards being well cropped, whilst others in the same district had very poor crops. The best of the cookers were Early Victoria, Royal Jubilee, Lane's Prince Albert and Lord Derby. Of the dessert varieties Blenheim Orange, Gladstone, Charles Ross, Beauty of Bath and Allington did well.

In Westmeath the crop was the worst for years. The old trees bore fairly well, but there was practically no crop on the young trees.

The crops in Counties Wexford and Wicklow were on the whole fairly good, especially the cooking varieties, of which Lane's Prince Albert, Bramley's Seedling, Newton Wonder, Grenadier and Lord Derby were the heaviest croppers. Of the desserts, Allington Pippin, Charles Ross, Beauty of Bath, Ellison's Orange, Worcester Pearmain, American Mother and White Transparent cropped best.

PEARS.

It is only in the south eastern, southern and south western counties that pears produce a remunerative crop in the open. In the midland and northern counties the trees need to be in a very well-sheltered position or planted against walls to protect them from the severe weather which usually prevails when the trees are in flower. Many growers thought the 1936 crop would be

ruined by the wintry weather during flowering and setting periods. However, sufficient flowers weathered the storm to produce a crop better than was anticipated, and many of the fruits were of large size, good colour and good flavour, especially those on walls. A number of the early varieties, such as Williams' Bon Chrétien, did not swell up to normal size, nor was the flavour as good as usual, and many of them were affected with Pear Scab.

In Counties Carlow, Galway, Kerry, Longford, Mayo, Sligo and Westmeath the crop was from average to below average in quality and quantity, but good crops of Pitmaston Duchess were reported from some centres.

Fair crops of Williams' Bon Chrétien. Conference and Brown Beurre were obtained on walls in Co. Cavan.

In Co. Cork the fruit did not set as well as usual but good crops of Clapp's Favourite, Fertility, Durondeau and Pitmaston Duchess were obtained, especially on walls.

Good crops were produced in counties Dublin, Kildare, Kilkenny, Laoighis and Limerick especially on trees of Conference, Doyenné du Comice. Pitmaston Duchess, Beurre Bachelor, Santa Claus, both on walls and in the open, bore very heavy crop. Williams' Bon Chrétien bore well in Co. Dublin, but the fruits did not swell up to their usual size and were of inferior flavour.

There was a good crop in Donegal, both on walls and also on old orchard trees.

Heavy yields were obtained in sheltered gardens in Co. Wicklow, where very large fruits of Pitmaston Duchess, Marguerite Marillat, Doyenné du Comice, Durondeau, Marie Louise and Beurre d'Amanlis were produced.

Though pears are not much grown in Co. Leitrim, very good crops were produced on wall trees where proper spraying was carried out. In Co. Limerick large trees in old orchards bore very heavy crops, but the fruits were not so large as usual.

In Co. Tipperary very heavy yields were obtained, especially from the varieties Doyenné du Comice, Beurre Hardy, Marie Louise, Duchesse d'Angoulême and Pitmaston Duchess; but in general the fruit was not up to the usual size, appearance or flavour.

The demand for good pears is much greater than the supply, and where wall space is available and in sheltered gardens more pear trees should be planted to supply this demand. It is essential that only those varieties which succeed well in the particular district should be planted. The varieties for which there is a demand, and which succeed well in most districts, are Pitmaston Duchess, Marie Louise, Beurre Hardy, Beurre Diel, Louise Bonne of Jersey, Doyenné du Comice, Durondeau and Williams' Bon Chrétien. It is found that not only are these the varieties most in demand but also that they are the varieties which in general bear the heaviest crops of good clean fruit.

PLUMS.

On the whole these were average and upwards in yield. This was the case in the areas where this fruit is cultivated in large quantities for market purposes. Owing to the cold, damp weather, the trees continued bearing later than in normal years. In a number of small private gardens the crop was below the average, due mainly to the trees having borne a heavy crop in the previous year. The trees in general did not flower so freely as last year, and much damage was done by bullfinches to the flower buds before they had expanded. This was most serious in Counties Galway, Laoighis and Wicklow.

In Co. Cavan, Victoria and River's Early Prolific yielded heavy crops, but Czar was poor.

In Carlow the yield was below the average in general.

The yield on trees in the open in Offaly was one of the worst for a number of years and, even on walls the crop was much below the average.

Heavy yields were obtained in Kildare, Dublin, Longford, Meath, Mayo, Waterford, Westmeath and Wexford.

In some gardens in Roscommon the crop was so heavy as to render thinning necessary.

In Co. Tipperary the yield was below normal, with the exception of Victoria, which bore a good crop of very fine quality fruit, though late in ripening.

On the whole the heaviest cropping plum was Victoria, followed by Czar and River's Early Prolific. In North Co. Dublin and Co. Meath, where there are large numbers of trees of the old Horse Plum, the crop was a good one. In general the fruits were smaller than usual.

Laxton's Gage produced some very fine fruit in Co. Westmeath.

In sheltered positions in Laoighis, Victoria, River's Early Prolific, Kirke's and Monarch yielded good crops of large, well-coloured fruits.

DAMSONS.

These appeared to escape the spring frosts, which often play havoc when the trees are in full flower. The trees in general flowered freely and, as the previous year's crop was below average, the flowers were strong and set well. It might be said that damsons were the outstanding fruit crop of 1936. In the Ballyhoe-Magheracloone districts of Meath and Monaghan, North Co. Dublin and East Meath, where the crop is usually marketed, there was an exceptionally heavy yield, and growers had some difficulty in disposing of supplies at remunerative prices. The fruits in general were slightly smaller than usual, especially where the crop was a heavy one.

In Offaly and Westmeath the crop was almost a failure, and in Louth the yield was below average, owing to very severe frosts in early April.

STRAWBERRIES.

This crop promised well as little damage by frost was reported except in Counties Dublin and Monaghan. Although about fourteen days later than usual in coming into flower, the plants bore large quantities of very strong flower spikes, and these set a heavy crop of berries. The early ones and those growing on early borders, especially Royal Sovereign and Madam Lefebvre, suffered very much from drought in April and May, and many of them did not swell to their normal size, being hard-cored and misshapen. The more favourable weather prevailing during the mid-season enabled some very fine crops to be obtained, especially with Royal Sovereign, Madame Kooi, Oberschlesien, Tardive de Leopold and Leader.

Owing to the continuous wet, sunless and damp mid-season, fruit coming from then to the end of the season was very severely attacked by slugs and snails, and it is many years since so many fruits were destroyed by almost continuous rain. Many of the fruits became mildewed and unfit to gather before they had properly coloured. The result was that, though many of the commercial growers had a larger area under strawberries than in the previous year, much less fruit was produced. On the whole, however, especially with private gardeners, the crop could be considered average to good. In Co. Cork it was described as the best for several years. Demand from jam manufacturers was good.

RASPBERRIES.

In general these bore very heavy crops, in fact the heaviest for many years, and the fruits were of good size, appearance and quality. The heavy rains and damp weather during ripening helped the fruits to swell to a larger size than usual. Of the 134 returns received, 108 reported yields above the average, and in only one case was a yield below average reported. In Counties Cavan, Kerry, Mayo and Sligo the yields were only about average, owing to a number of the tips of the shoots being injured by frost. The crop was exceptionally good in Counties Cork, Galway, Limerick, Kildare, Longford, Meath, Tipperary, Westmeath and Wicklow. In the large plantations near Dublin the yields were high in general.

Much heavier crops than usual were obtained in the County Meath districts of Duleek, Gormanston and Julianstown, where the bulk of the supplies for the Irish jam manufacturers is grown. The variety Lloyd George is still outstanding as a heavy cropper. It produces very heavy yields in every county. A promising variety, Norfolk Giant, was tried on a fairly large scale this year in Counties Dublin and Limerick and gave good results, yielding heavy crops of large, well-coloured fruits, and at the same time producing good strong canes for next year's fruiting. The area under raspberries has lately been very much increased in the Irish Free State, especially in Counties Dublin and Meath, where large plantations have been put down. The extra produce will probably be absorbed by the jam manufacturers who require more home-grown raspberries than they can usually obtain.

LOGANBERRIES.

These were an exceptionally heavy crop, owing chiefly to the heavy rains during the growing and ripening periods. The moist, mild autumn weather also prolonged the season, and very large fruits were produced up to a later period than usual. The fruits in general were of extra large size and of very good colour and appearance. Of the 116 reports received 101 stated that yields were over average, and only two reported yields below average. Indeed, loganberries were an outstanding feature of this year's fruit crop. The heaviest yields were obtained in Counties Cavan, Cork, Dublin, Limerick, Louth, Tipperary and Waterford. Yields below the average were obtained in Counties Roscommon and Westmeath. This fruit is growing in favour, especially with small holders who have only a limited space for cultivation and also with the general public for dessert purposes.

BLACK CURRANTS.

These were an exceptionally heavy crop, one of the heaviest for some years. Of the 127 reports received, 111 stated that the crop was above the average. This was especially the case in Counties Cavan, Dublin, Galway, Kildare, Mayo, Roscommon and Waterford. In Cavan the crop was the best since 1932. In Counties Louth, Monaghan and Wicklow the yields were average and under. In almost all cases the fruits were larger than usual, very well coloured and of excellent flavour. This was chiefly due to the showery weather prevailing during the period while the fruit was swelling and maturing. In most districts the crop was late in ripening, although in Co. Cork it ripened slightly earlier than usual. In portions of Counties Dublin, Longford and Sligo spring frosts caused some damage to the early flower trusses.

The two outstanding varieties for cropping were Victoria (sometimes sold under the name Goliath), and Boskoop Giant. In County Waterford Daniel's September Black and Baldwin produced heavy crops.

RED AND WHITE CURRANTS.

Owing to the harsh, dry and cold weather prevailing when the buds commenced to open, these did not flower until much later than usual, with the result that practically no damage was done by frost, and as moist, cool weather prevailed as the fruit swelled, an exceptionally heavy crop of large fruit was produced. The wet weather during July kept down the attacks of Sawfly caterpillar and very little damage was done to the foliage. Laxton's Perfection and Red Dutch were heavy yielders. Extra heavy crops were obtained in Counties Dublin, Galway and Westmeath, while in Tipperary it was the heaviest for years. A new Red variety, Pearsons Seedling, produced heavy crops and appears to be promising. Owing to the heavy yields, supply exceeded demand and the crop was difficult to dispose of at remunerative prices.

GOOSEBERRIES.

This fruit gave what might be termed an average crop. Of the 145 reports obtained, 50 spoke of crops above and 52 below the average. Plantations in exposed positions suffered very much from cold and sleet during the flowering period and, immediately the small fruits had set, many of them turned brown and dropped off. This was especially the case in Counties Clare, Laoighis, Louth, Roscommon and Wexford. Very heavy crops were obtained in Co. Cork and the fruits were large and of good appearance. In counties Carlow, Kerry, Kildare, Mayo, Tipperary and Waterford the yield was above the average. In the large orchard plantations of Counties Dublin, Meath and Wicklow the crop was a very heavy one and the fruit was exceptionally large and of good appearance. Large quantities from these areas were disposed of in the Dublin Market. The best yielding varieties were Whinham's Industry, Careless, Crown Bob, Keepsake and Whitesmith.

Though on the whole the crops were not so heavy as usual, the fruits were much larger and of better appearance. This was due to the showery weather prevailing when the berries were swelling.

CHERRIES.

On the whole these were a very satisfactory crop, especially in districts where the fruit is grown solely for market purposes. Both dessert and cooking varieties produced one of the best crops for years. Cooking varieties carried very heavy crops. The trees flowered later than usual, and thus escaped the spring frosts, which generally cause so much damage to the crop.

Of 81 reports received, 61 stated that the yield was from average to very good and only 5 reported poor crops.

Birds appeared to be more troublesome than usual and were difficult to control in the large plantations.

Very heavy crops of May Duke, Black Heart and Kentish Red were produced in Counties Clare, Donegal, Laoighis and Waterford on large trees in old orchards.

Heavy crops of Kentish Red, Nouvelle Royale, Old Black Heart, White Heart, Early Black Morello and Late Duke were produced in Co. Wicklow, in both large orchards and small gardens.

Morello cropped well in almost every garden and is a very reliable variety to plant.

Owing to the continuous rains, the late varieties suffered very much from splitting, which lowered their market value.

FIGS.

These, though a fair crop, were not up to their proper standard, and except on good walls in a favourable aspect and where trees were well tended generally, good crops were not produced. The season was most unfavourable

for the production of good clean crops of this fruit. The trees were late in commencing growth and, owing to the cold and wet summer, the fruits did not develop to their normal size and colour, and they were slow in ripening. In general the crops were better in the southern counties especially in Cork, Limerick, Tipperary and Wexford and also in Co. Dublin. Poor to average yields are reported from Counties Cavan, Kildare, Longford and Monaghan.

PEACHES.

Peaches, on the whole, were not a success this year. This was chiefly due to unfavourable weather conditions. The trees flowered about a fortnight later than usual, which was considered in their favour, but owing to the cold weather during the growing period, there was only a poor set of fruit which did not swell up to the usual size. The colour, appearance and flavour were also much below normal. Only where the trees were comparatively young and on well sheltered walls and well tended was there what could be called fair to good crops. Favourable reports were received from Counties Cork, Dublin, Louth, Meath and Tipperary. Poor crops were reported from Counties Cavan, Kildare, Limerick, Longford, Monaghan and Offaly.

On the whole outdoor peaches do not receive attention as to pruning, spraying and manuring sufficient to produce good clean fruits of marketable size, colour and flavour.

Only a few varieties are suitable for outdoor cultivation, the best being Royal George.

INSECT PESTS.

The weather conditions during the growing period were unfavourable to the spread of insect pests, and these were less troublesome than usual. Growers are now taking precautionary measures to prevent serious attacks by applying some form of tar-oil wash in the winter to kill the eggs of injurious insects on the bark of the trees. These washes also clear the trees of moss and lichen in which certain insects hibernate. More interest is also being given to the killing of insects by spraying in summer, and so preventing them from injuring the trees and bushes, by eating the foliage.

American Blight or *Woolly Aphis* is still very prevalent in Counties Carlow, Dublin, Kildare, Monaghan and Wicklow.

Gooseberry Sawfly did a little damage in counties Clare, Cavan, Kilkenny, Limerick, Mayo and Wicklow.

Leaf-curling Aphis caused some damage to Plums and Damsons in Counties Dublin and Meath.

Apple Capsids are still spreading and causing considerable damage in Counties Cavan, Kildare, Louth, Monaghan and Roscommon.

Winter Moth, *Apple Blossom Weevil* and *Ermine Moth* were not so troublesome as usual.

Very slight damage was done by the *Raspberry Beetle* this year, owing to the plants having been properly sprayed in time with Derris compound.

There were very few reports on the prevalence of *Black Currant Mite*.

It is many years since *Wasps* were so scarce.

As stated previously *Slugs* and *Snails* did much damage. This was due to the showery weather prevailing during the ripening period.

Bullfinches were reported as doing much damage in Counties Clare, Dublin, Limerick, Tipperary, Westmeath and Wicklow. Early in January they attacked the Red and White Currant bushes, and later Gooseberries, Plums, Damsons, and Pears by eating the newly-formed flower buds. Where much damage is being done their numbers should be reduced.

FUNGI.

The most injurious fruit tree fungi that have to be contended with are *Apple Scab* and *Pear Scab*. In Counties Clare, Cork, Dublin, Kerry, Mayo and Waterford they were reported as doing serious damage, but in counties Carlow, Cork, Longford, Limerick, Louth, Meath, Roscommon, Sligo, Tipperary and Westmeath scab was not so prevalent as usual and the fruits in general were clean. In orchards and gardens where the trees were properly sprayed, *i.e.*, sprayed at least three times, the fruits were comparatively clean.

Silver Leaf on Plums is still very prevalent in Counties Donegal, Dublin, Kildare, Meath and Wicklow. The variety *Victoria* is the one which is generally attacked. Cherries were also attacked in Counties Dublin and Wicklow.

Apple and Pear *Canker* is still causing trouble on old trees but not so much on those planted during the last few years, as growers are now in most cases planting varieties which are not so susceptible to the attack of this fungus.

Cluster Cup on Gooseberries was not so prevalent as during the few previous years, being reported only from Counties Galway and Laoighis as doing much damage.

American Gooseberry Mildew is still causing much damage in Counties Cork, Kildare, Laoighis, Tipperary and Wexford. This is a notifiable disease, under the American Gooseberry Mildew and Black Currant Mite order of 1912, and it is essential that all diseased bushes should be properly sprayed as described in the Department's Leaflet No. 76 ; or else dug up and burned.

Apple Mildew was not so prevalent as in past years, being reported as doing serious damage only in Counties Laoighis and Westmeath.

Blossom Wilt Rot caused much damage on apple trees in Counties Cork, Dublin, Laoighis, Sligo and Wexford. This disease is gradually becoming more prevalent.

MARKETS.

Prices in general, and especially those ruling in the Dublin Market, were slightly below those of previous years, except for fruit exceptionally well grown, well graded and packed in an attractive manner.

The prices for bush fruits opened well, as a light crop was anticipated, the weather conditions being unfavourable. Later the weather improved, and large quantities were placed on the market, causing the prices to drop a little, especially for strawberries. Towards the end of the season only good, clean fruit realised a remunerative price. Owing to the wet conditions in July the late varieties of Strawberries suffered from attacks of slugs and mildew, and the large growers who supply the jam manufacturers lost a large percentage of their crops.

In the large cities and towns there was a fairly good demand for all soft fruits, but growers situated in country districts found a difficulty in obtaining even fair prices for their produce.

During the last few years large quantities of soft fruits have been produced in Counties Dublin and Meath for direct sale to the jam manufacturers, and much of the selected fruit from these growers is well packed, and sold in the Dublin Wholesale Fruit Market where it realises high prices.

STRAWBERRIES.

Strawberries still remain the most popular soft fruit. Prices varied in different districts. In counties Clare, Cork, Galway, Longford, Louth, Mayo, Meath, Offaly, Tipperary, Westmeath, Wexford and Wicklow the market opened at 1/6 per lb. and later came down to 6d. per lb. Good prices were obtained for high-class fruit grown in Co. Dublin, a few selected lots selling as high as 4/- per lb. In Counties Kerry, Laoighis, Kilkenny, Roscommon and Sligo prices commenced at 2/- to 2/6 and dropped to 1/- and finally to 9d. per lb. In Dublin £48 per ton was paid by the jam manufacturers.

BLACK CURRANTS

The fruit was of very good quality and in most cases there was a good demand, both for cooking and home jam making. The price was, however, below that of last year. In the Dublin Fruit Market the early fruit sold at 10d. per lb., but the price gradually dropped to 6d. per lb. In Counties Cork, Limerick, Offaly and Sligo prices were 6d. to 8d. per lb. In Galway, Mayo, Roscommon and Waterford only 4d. to 5d. per lb., was realised. Jam manufacturers paid 56/- per cwt. in Cork and Sligo, 50/- in Dublin and Monaghan and 48/- in Galway.

RASPBERRIES.

The early fruit in the Dublin Market sold at 1/2 per lb. and as the supply increased the price gradually dropped to 8d., with poor quality down to 6d. per lb.

In Counties Carlow, Clare, Galway, Tipperary and Waterford, the price commenced at 8d. and dropped to 5d. per lb.

Jam manufacturers paid £39 per ton in Dublin and Meath and £42 in Cork.

GOOSEBERRIES.

Exceedingly large quantities were brought into the Dublin Market, packed chiefly in 12-lb. chip baskets. Some were put up in flat trays holding from 6 to 12 lb. each.

Small early green fruits sold well in 1-lb. punnets at from 8d. to 10d. per punnet. Later the price dropped to 5d. and 6d. per punnet. As consignments of ripe berries came on there was a good demand at from 3/6 to 4/6 per 12-lb. punnet, but later the ruling prices were from 2/- to 2/6 per 12-lb. chip.

In Counties Clare, Cork, Galway, Kerry, Kilkenny, Laoighis, Longford, Mayo, Offaly and Westmeath the ruling prices were from 3d. to 5d. per lb.

In some districts of counties Cork, Mayo, Kerry and Wexford sales are by gallon measure.

In Dublin and Meath the jam manufacturers paid from £12 to £16 per ton.

LOGANBERRIES.

These are usually cultivated in large private gardens, and it is only the surplus which is sold in Dublin and large provincial towns.

There was a good supply on offer in the Dublin Market, and the fruit was in general exceptionally large and very well coloured. The first early lots to be sold brought 10d. per lb. but as the supply increased the price gradually dropped to 6d. and 8d. per lb. and poor quality fruit brought as low as 4d. per lb.

In Counties Cork, Galway, Limerick, Tipperary and Waterford there was a good demand at from 6d. to 8d. per lb.

Loganberries are generally packed in 1-lb. punnets, though some are marketed in flat trays of about 6 lb. and some in 2-lb. chips.

The highest price paid is for good quality fruit in 1-lb. punnets.

RED AND WHITE CURRANTS.

Heavy supplies came to market, but demand was below normal. Very little of these fruits is sold to the jam manufacturers, most of it being bought by retailers and private customers for home preserves.

The first fruits to be marketed in Dublin brought 8d. per 1-lb. punnet, but the usual price was 5d. to 6d. per lb. The smaller fruits, marketed in trays and 6-lb. chip baskets, brought as low as 3½d. and 4d. per lb.

APPLES.

Chiefly owing to the customs duty on imported apples, slightly higher prices were obtained for the home produce, especially good-quality, well-graded early fruits, both of dessert and cooking varieties.

There was no glut in the Dublin Market at any time during the year, and all good quality fruit commanded a ready sale. Good early desserts, such as Irish Peach, Mr. Gladstone, Beauty of Bath and Worcester Pearmain sold at from 3/- to 3/6 per 12-lb. chip, the bulk of these varieties being marketed in this type of package. Some were sold in flat trays containing two layers of fruit. These sold at from 8d. to 1/- per doz. according to quality. Early cookers, such as Early Victoria, Lord Grosvenor, Ecklinville and Grenadier were in good demand. These were chiefly from local growers and were marketed in 12-lb. chips which sold at from 2/6 to 2/9 each. Later in the season the supply of cookers increased very much, and they were chiefly marketed in kegs of $4\frac{1}{2}$ to 5 stone and in barrels of about 9 stone. The chief varieties marketed in these receptacles, mainly from growers in Counties Carlow, Cavan, Louth, Meath and Monaghan, were : The Queen, Bismarck, Grenadier, Lord Derby, Royal Jubilee and Peasgood's Nonsuch. Kegs sold at from 6/- to 8/- each and barrels from 12/- to 17/- each, according to quality.

Later, when the mid-season and late-dessert varieties were being marketed, there was an increased supply. Demand remained good, especially for first grade fruit marketed in 12-lb. chips, trays, or bushel boxes. The chief varieties on sale during this period were James Grieve, Charles Ross, Rival, Allington Pippin, Cox's Orange Pippin, King of the Pippins and Blenheim Orange. Good-quality fruit of these varieties brought from 2/- to 3/- per chip, from 3/- to 5/- per tray, and from 6/- to 8/- per bushel box.

Mid-season and late cookers were in fairly good supply, and were chiefly of the varieties Lord Derby, Lane's Prince Albert, Newton Wonder, Annie Elizabeth, Royal Codlin, Waltham Abbey Seedling, and Bramley's Seedling, with a small quantity of Scarlet Bramleys. Supplies came chiefly from Counties Carlow, Cork, Dublin, Kildare, Kilkenny, Meath, Monaghan, Tipperary, Westmeath, and Wicklow. Prices varied from 6/- to 12/- per keg, and from 12/- to 28/- per barrel. Low-grade and badly-packed fruit brought the lower prices. While Dublin is an excellent market for good-quality, well-packed fruit, very low prices are obtained there for fruit of poor quality.

In Counties Clare, Cork and Tipperary reports came to hand of local gluts during the end of September and early October, due to windfalls, but in general the quantity of windfalls appears to have been well under the average for this particular period.

The following are details of prices prevailing at a few local centres :—

In Clare first-grade desserts sold at from 8d. to 1/- per doz. or about 3/6 to 4/- per stone, and a few extra good barrels of Bramley's Seedling realized as high as £1 10s. 0d. per barrel.

In Cork desserts sold at from 2/6 to 3/6 per stone and cookers 2/- to 2/6 per stone, and at 18/- to 24/- per barrel for selected fruit.

Good prices were realised for good fruit in Kildare, *i.e.*, up to 24/- per barrel, but the poorer qualities went as low as to 10/- per barrel.

In Limerick early apples sold at 9d. to 1/- per dozen according to size and appearance.

In Mayo cookers sold at 2/- to 2/6 and desserts at from 3/- to 3/6 per stone.

In Sligo the early dessert variety, Beauty of Bath, sold very well at from 3/- to 5/- per stone, and cookers from 1/6 to 2/6 per stone. Boilers for making jam sold at from £1 10s. to £6 per ton. Second-grade Bramley's Seedlings brought £12 and first grade £20 per ton.

In Tipperary culls and windfalls for cider making sold at from £3 to £4 per ton.

There was a good demand in Waterford, where cooking apples sold at from 1/6 to 3/- and desserts from 2/- to 4/- per stone.

PEARS.

There was a keen demand in the Dublin Market for high-class fruit, well graded and attractively packed. The highest price was paid for very good, clean specimens of Pitmaston Duchess, some of which sold as high as 5/- per dozen, but the general run was from 1/6 to 2/6 per dozen. Good specimens of Durondeau, Conference, Beurre Hardy and Marie Louise sold at from 1/- to 2/-, and second grades 6d. to 1/- per dozen.

The fruit was mostly packed in 12-lb. chips, which brought from 2/- to 3/6 per chip according to size and appearance.

The best quality pears were generally wrapped in paper and marketed in flat trays holding from 24 to 30 fruits each.

Good early fruits of Williams' Bon Chrétien sold at 1/6 to 2/- per dozen, but there was a large percentage of small low-grade fruit which was difficult to dispose of.

In Limerick pears sold well at from 1/- to 3/- per dozen, Pitmaston Duchess being in most demand.

Good quality fruit sold at 2/- per dozen in Counties Clare, Galway, Offaly, Sligo, Waterford, Westmeath and Wexford. Second quality sold at 1/- per dozen.

PLUMS.

In general there was a good supply of plums in the Dublin Market and, on the whole, prices were lower than last year.

The variety Victoria commanded the best price. Extra fine specimens grown in Co. Dublin, well-coloured, well-graded and packed in 12-lb. chips or in single layers in flat trays of from 8 to 10 lb., brought as much as 10d. per lb. Second-grade fruits brought from 6d. to 8d. per lb. and lower-grade from 4d. to 6d. per lb.

Fully 80 per cent. of the plums sold were marketed in so-called 12-lb. chips, but many of these chips contain as much as 14-lb. weight of fruit.

Large quantities came from North Co. Dublin and from the Gormanston and Duleek areas of Co. Meath.

Early Orleans sold at from 3/6 to 6/-, Czar 3/- to 5/-, and Horse Plums 2/6 to 4/- per chip. On the whole there was a good demand at these prices.

In Donegal and Waterford plums realised from 6d. to 1/- per lb. In Cork 4/6 per stone, Limerick 5/- to 7/- per stone, and in Wicklow 2/6 to 3/- per stone were obtained, while in Clare the price was 3d. to 4½ per lb., in Galway 4d. per lb., in Louth 6d. per lb., in Tipperary, 6d. to 8d. per lb., and in Westmeath 4d. to 6d. per lb.

DAMSONS.

There was a very heavy supply of these on the Dublin Market, and at times it was difficult to effect a clearance.

The Magheracloone-Ballyhoe districts of Counties Monaghan and Meath provided the great bulk of this fruit. Supplies also came from Kildare, Louth, North County Dublin, and from the Gormanston, Julianstown and Duleek areas of county Meath.

The first consignments sold at 3/6 to 4/- per chip, and later the price dropped to 1/6 and 2/- per chip. Kegs and small barrels of 5 to 6 stones sold at from 6/- to 8/- each.

While a good deal of this fruit was marketed in 12-lb. chips, a very large proportion came on in kegs and barrels, which are not suitable or economical containers for the transport of stone fruits. Growers are more likely to receive a remunerative return for damsons carefully graded and sent to market in 12-lb. chips. As in the case of plums, a well-filled chip will hold up to 14 lb. of damsons. The chip is a very handy container for a householder purchasing fruit in the market, as it can be carried home easily and holds a convenient weight of fruit for the average family.

NATIONAL EGG-LAYING COMPETITION, 1935-36.

The Twenty-fourth Egg Laying Competition, conducted by the Department of Agriculture, was held at the Munster Institute, Cork, during a period of 48 weeks, beginning on the 4th October, 1935, and ending on the 3rd September, 1936. A total of 117 pens, of six pullets each, having satisfactorily fulfilled the required conditions, was accepted.

The Competition was arranged in Sections as follows :—

Section	I.—White Wyandotte	..	..	..	..	24	pens
Section	II.—White Wyandotte (confined to holders of Egg						
	Distribution (hen and duck) Stations in 1935..	20	„				
Section	III.—Rhode Island Red	..	..	..	..	21	„
Section	IV.—Rhode Island Red (confined to holders of Egg						
	Distribution (hen and duck) Stations in 1935..	22	„				
Section	V.—Any non-sitting breed	..	..	..	..	12	„
Section	VI.—Any other general purpose breed	..	..	..	..	18	„

Station holders were, as heretofore, allowed to enter a second pen in one of the open sections on payment of the requisite entry fee.

As in the five previous Competitions, only pullets which were certified by the Veterinary College, Ballsbridge, Dublin, as being free from Bacillary White Diarrhoea, were accepted.

The clause introduced in the Regulations in 1928-29, whereby birds were required to be of specific minimum weights on arrival, was enforced. The following were the prescribed minimum weights for the respective breeds :—

Minimum	All non-sitting breeds	..	..	3½ lb.
Weights	White Wyandottes	..	..	4½ lb.
	Rhode Island Reds	..	..	4½ lb.
	Plymouth Rocks	..	..	5 lb.
	Sussex	..	..	5½ lb.
	Any other sitting breed	..	..	5½ lb.

Eggs were graded as follows :—

Special grade—2 ozs. and over for the first four weeks (4th October to 31st October, inclusive).

Egg Grades	2 $\frac{1}{8}$ ozs. and over for the second four weeks (1st November to 28th November, inclusive).
	2 $\frac{1}{4}$ ozs. and over throughout the remainder of the competition.

First grade.—1 $\frac{7}{8}$ ozs. for the first four weeks (4th October to 31st October, inclusive).

1 $\frac{1}{2}$ ozs. for the second four weeks (1st November to 28th November, inclusive).

2 ozs. during the remainder of the competition.

Second grade.—Eggs which were not more than $\frac{1}{4}$ oz. less than the weight prescribed for first grade eggs in the same period.

Eggs which weighed less than the weight prescribed for second grade eggs were recorded separately, but were not included in the score total on which awards were based.

Special and first grade eggs were included in the one category for the purpose of awarding prizes.

As regards egg size, twenty-one pens were disqualified for producing more than 20 per cent. of second grade eggs. The respective percentage of each breed disqualified in this connection in each of the nine Competitions, since the clause was introduced in the Regulations, is given in Table VI.

Egg Yield	Making no allowance for deaths the average number of eggs per pullet was 186.5. The average number of eggs per pullet for which a record for the full 48 week period was available was 193.7 (See Table II.)
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One Rhode Island Red and one Barred Rock pullet did not lay during the Competition. The average yield per pullet and the percentage production for each breed during each of the twelve four-weekly periods are given in Tables VIII and IX respectively.

All pens reached the standard egg-weight of 24 ozs. or over per dozen.
Egg The average weight of egg for each of the competing
Weights breeds is given in Table V.

Eggs under the The respective number of ungraded eggs laid by
Prescribed Weight pullets of each breed which completed the full 48-week
for Second Grade period is given in Table VII.

Of the 644 pullets which completed the full 48-week period 217, or 33.7
per cent., laid 200 first grade eggs or over and not more than
Copper 20 per cent. second grade as compared with 226 in the previous
Rings Competition. Of those, 203 were leg banded with numbered
and sealed copper rings. Copper rings were withheld from
the following birds :—

Eight pullets which were consistent producers of inferior quality eggs.
(Mis-shapen and poor shell texture).

One White Leghorn Pullet which produced tinted eggs.

One White Wyandotte Pullet with defective eyes.

One White Wyandotte Pullet with feathered shanks.

Two Rhode Island Red Pullets which were not up to breed
standard.

One Rhode Island Red Pullet which was ill and was killed at the close
of the Competition.

The rings were distributed as follows :—

1 pen	..	Five copper rings
7 pens	..	Four „ „ each.
28 „	..	Three „ „ „
25 „	..	Two „ „ „
36 „	..	One „ „ „

Particulars as to eggs produced by birds which were awarded copper rings
are given in Table XIII.

A total of 349 birds, representing 54.2 per cent. of the total for the full period, qualified for certificates. Of these, 110 birds (17.1 per cent.) were awarded Special Certificates, 99 birds (15.4 per cent.) First Class Certificates, and 140 birds (21.7 per cent.) Second Class Certificates (See Tables XIV. and XV.).

Out of the 702 pullets accepted for the Competition, 58 or 8.26 per cent. died as compared with 10.9 per cent. in the previous Mortality Competition. Analysing this mortality figure it will be seen that nearly 50 per cent. of the deaths were directly or indirectly due to ovarian disorders. The death rate for the first six months of the test was only 1.7 per cent. In 78 out of the 117 pens included in the Competition not a single pullet died, the deaths being confined to the remaining 39, viz. :—

5 pens	..	3 deaths each
9 „	..	2 „ „
25 „	..	1 death „

Particulars as to the cause of death and the percentage number of deaths for each breed are given in Tables XVI. and XVII. respectively.

The system of feeding was similar to that of previous Competitions. The birds were fed three times daily. The morning feed consisted of half the grain ration given as scratch feed in the litter, the Feeding mid-day feed of wet mash, and the evening feed of the remainder of the grain ration fed in troughs. Dry mash was fed ad lib. The foods which were made up by weight corresponded approximately to the following formulae for both wet and dry mash :—

4 Parts Pollard
3 „ Bran.
2½ „ Maize Meal Mixture
½ „ Finely Ground Oats
1 „ Fish Meal

The grain mixture consisted of equal parts of wheat, oats and cracked maize. Vegetables, such as cabbage, kale, turnips and mangels were

fed in addition, and also grit and shell. The following quantities of foods were fed :—

Mixed Meals	..	42,504 lb.
Oats	}	.. 28,224 lb.
Wheat		
Cracked Maize		
Grit and Shell		3,888 lb.

WHITE WYANDOTTES.

The twenty-four pens of birds which comprised this Section compared very favourably with those of former Competitions. The majority were composed of typical well-grown birds showing plenty of vigour and body-size. The elimination of pen-variation was a noted feature, the birds having been selected to ensure equality as regards age and appearance. Strong eye colour was very pronounced.

The egg yield for the first period was extremely good, over 66 per cent. of the birds in this section being in production. This figure would have been higher were it not for the fact that most of the remaining birds were moulting or had not reached laying standard when the Competition commenced. With the exception of five birds, all were in full production by the end of the winter period, and individual and average records were very creditable.

Size of egg compared favourably with previous Competitions, only five pens being disqualified for producing more than twenty per cent. second grade eggs, and one pen on not reaching the specified number.

A special word of praise is due to the owner of the winning pen in this section, who is also the winner of the Silver Cup for the second year in succession. It is a notable achievement and one worthy of congratulation.

The competing birds in this section were not so varied as heretofore, the greater number being splendid specimens of their breed, conforming well to type, size and general appearance. A few pens were composed of small cobby birds which lacked stamina and vitality, characters which are absolutely essential if birds are to withstand the strain of continued heavy production. The ultimate performances of these pens clearly demonstrated their inferiority.

Over 42 per cent. of the birds were moulting on arrival; but having come on to lay they made steady progress, and the winter average was practically equal to that in Section I.

Size of egg was extremely good, only two pens being disqualified for producing more than twenty per cent. second grade eggs and three pens for not having reached the required number.

On examination of the two Wyandotte Sections it was obvious that breeders have made very great strides in the betterment of their stock, maintaining and improving such qualities as type, body-size, excellent head points and sound eyes, and eliminating feathered shanks. It was only by consistent rigorous selection that this degree of quality could have been attained, and were it not for the fact that a few individuals in both sections lacked size, the standard of the competing birds was very high.

A factor, however, not to be overlooked is the quality and colour of egg. The increase in the number of inferior quality eggs produced clearly demonstrated that breeders are not paying sufficient attention to this very important point.

The low rate of mortality in these sections indicates that the breeders concerned are devoting greater attention to vigour and stamina, characters which can be maintained only by continual selection combined with methodical culling.

RHODE ISLAND REDS.

In this Section twenty-one pens of Rhode Island Reds were accepted.

As regards type and breed characteristics, they were very satisfactory. With the exception of two pens which were slightly mealy and smutty in appearance, the colour of the pens was excellent. In comparison with previous Competitions there was remarkable uniformity in the pens in this section.

About 70 per cent. were in production on arrival. The remainder were either moulting or had not reached laying condition.

The egg yields for the winter and the full periods were creditable, but nine pens failed to produce the required qualifying number. Size of egg was particularly good, only three pens being disqualified for producing more than twenty per cent. second grade eggs. One bird did not lay during the Competition.

The majority of the twenty-two pens in this section were excellent specimens of their breed, possessing qualities of good size, type and colour, the latter being particularly good.

Section IV.

About 28 per cent. of the birds were moulting on arrival, but they steadily came on to production, and the winter averages compared favourably with those in Section III.

The size of egg was excellent, only two pens being disqualified under the twenty per cent. rule. In some cases, however, the quality, shape, and texture of egg was not as good as it might have been, and colour in many cases was far too light for Rhode Island Red eggs.

Considering the two sections of Rhode Island Reds it was noticeable that grave faults such as immaturity and pen-unevenness had been eliminated to a very great extent. The majority of pens consisted of birds which possessed in a high degree the qualities of good size, type and colour, and their owners are to be congratulated on their successful endeavours in attaining this marked improvement. Inferior quality in eggs, as regards shape, texture and colour calls for comment, and breeders are advised to concentrate upon the elimination of this undesirable feature.

WHITE LEGHORNS.

The standard of the twelve pens in this Section varied considerably. A few were comprised of typical well-grown birds, but the type and size of the majority were not conducive to success in a laying Competition. The subsequent performances of the latter demonstrated their unsuitability as breeding stock.

Section V.

In some cases they proved to be layers of small eggs and were found to be lacking in the stamina and constitutional vigour necessary in stock birds.

Over 50 per cent. of the birds were moulting on arrival, and this, coupled with the fact that others were slow in reaching laying standard, handicapped them in putting up a creditable winter average.

Attention must again be directed to the necessity for improvement in body-size, together with quality and size of egg. It is only by continual selection of suitable breeding stock that the breed can be maintained at the desired standard.

Section VI.—ANY OTHER GENERAL PURPOSE BREED.

In this Section seven pens of Barred Rocks, six of Buff Rocks and five of Light Sussex were accepted.

In appearance the Barred Rocks were typical specimens of their breed, colour and markings being very good.

Barred Rock. As regards egg yield, however, the majority were poor producers, consequently their winter and final scores were rather low. Many individual birds failed in respect of egg size, and as a result four pens were disqualified under the twenty per cent. rule and three pens, for not reaching the required number. One bird did not lay during the Test.

Among the six pens of Buff Rocks four were composed of well chosen, large-bodied birds, with very good colour. **Buff Rock.** The remaining two pens were deficient in body-size, being rather small and slender for their breed. In spite of this, however, the average egg yield for the winter and full periods was satisfactory. With the exception of one pen which was disqualified, size of egg was satisfactory.

Four pens were disqualified for not having produced the specified number of eggs.

A decided improvement was noticeable among the Light Sussex pens which were composed of typical, large, well-developed birds **Light Sussex.** with excellent markings.

The egg yield for both winter and final periods was very creditable. Egg size was very good, only one pen being disqualified for producing more than 20 per cent. second grade.

It is interesting to note that the winning pen of Light Sussex also included the best individual bird in the Competition.

SUMMARY.

In the competition under review, the entries were generally satisfactory. In appearance, body size and breed characteristics, the Wyandottes and Rhode Island Reds were exceptionally good; the colouring of the latter being outstanding. The White Leghorns, Plymouth Rocks and Light Sussex were, on the whole, not up to the standard of the other breeds; the White Leghorns in particular being deficient in body size.

Egg yield was meritorious. No outstanding scores were recorded but the average was creditable.

The quality of eggs in respect of size, colour and shell texture was, on the whole, satisfactory. However, a limited number of birds in all sections produced eggs of inferior shell texture.

The death rate over the entire period of the competition was 8.26 per cent. which is considerably below the figure of 10.9 for the previous competition. Moreover, the deaths were confined to a relatively small proportion of the pens, and had it not been for the large number of deaths in a few pens, the mortality rate would have been exceptionally low. Indeed, and having regard to the normal death rate in laying pullets, a mortality of 8.26 per cent. must be considered as extremely satisfactory.

Analysing the mortality figure in conjunction with the particulars given in Table XVI, it will be observed that almost fifty per cent of the deaths were attributed to causes associated directly or indirectly with ovarian trouble. In this connection, it was noticed that birds which consistently produced eggs of inferior shell texture invariably succumbed, showing once more that poor shell texture is a definite indication of constitutional weakness.

TABLE I.

The following Table shows the number of pullets competing, the number of eggs laid, cost of food, return for eggs and gross profit for each of the twenty-four competitions held since 1912/13:—

Eleven months ended	No. of Pullets	No. of Eggs Laid	Average Number per Bird	Average Value per Bird	Cost of Food per Bird	Average Price of Eggs per doz.	Return per Bird over Cost of Food
				s. d.	s. d.	d.	s. d.
31st Aug., 1913	318	38,199	120.1	11 2.8	5 8	13.05	5 6.8
" 1914	282	39,216	139.0	13 3.6	5 8.8	13.77	7 7.3
" 1915	264	39,764	150.6	17 6	7 0.5	16.75	10 5.5
" 1916	294	49,830	169.5	23 0.5	8 11.8	19.58	14 0.7
" 1917	210	36,660	174.6	32 7.2	13 10.7	26.89	18 8.5
" 1918	210	36,106	171.9	47 4	16 6	39.66	30 10.1
" 1919	306	55,124	180.0	53 3.4	20 0	42.59	33 3.4
" 1920	354	65,840	185.98	53 9	19 3.9	41.62	34 5.2
" 1921	288	51,584	179.0	40 9.5	18 7.3	32.79	22 2.2
9th Sept., 1922	342	63,518	185.72	33 8.8	11 10	26.15	21 10
16th " 1923	198	38,519	194.5	27 11.5	12 1	20.75	15 10.5
15th " 1924	342	61,144	178.78	26 6.5	11 1.5	21.37	15 5
15th " 1925	348	63,755	183.2	27 4.9	10 5.2	22.58	16 11.7
15th " 1926	342	65,187	190.4	28 6.1	10 7.8	21.5	17 10.3
16th " 1927	492	93,912	190.88	26 10.7	9 8.6	20.3	17 7.1
16th " 1928	510	95,226	186.7	24 10.9	10 8	19.2	14 2.9
16th " 1929	540	101,820	188.6	23 8.5	11 0.5	21.9	17 8
16th " 1930	588	100,752	171.3	24 4.2	8 5.8	20.5	15 10.4
16th " 1931	588	111,180	189.1	24 4	7 8	18.5	17 1
15th " 1932	600	111,986	186.6	21 3.6	6 4.2	16.4	14 11.4
12th " 1933	606	113,047	186.5	17 11.6	5 1.8	13.9	12 9.8
10th " 1934	606	112,177	185.1	19 5	5 8.9	15.1	13 8.1
7th " 1935	702	131,384	187.1	18 3	6 7.7	14.0	11 7.3
3rd " 1936	702	130,940	186.5	20 7.5	7 3.2	15.9	13 4.3

It should be noted that the figures given in Table I above are based on the total number of pullets competing, no allowance having been made in respect of deaths during the test.

Taking the birds which died during the 1935-36 Test into account only up to the date of death, the average number of pullets for the whole period was 682.9, and the average number of eggs per bird 191.7. On this basis the average egg value per bird was 21s. 2.4d., the cost of food per bird 7s. 5.6d., and the return per bird over cost of food 13s. 8.8d.

On Tables II to IV pullets which died during the competition have been eliminated from the calculations and the averages for the remaining birds are given.

TABLE II.

Average Egg Yield from each Breed.

BREED	No. of Pullets for full period	No. of eggs laid	Average No. of eggs per pullet	GRADE AVERAGES PER PULLET		
				Special	First	Second
White Wyandotte ..	253	50,521	199.7	91.7	89.7	18.3
Rhode Island Red ..	233	44,090	189.2	78.8	89.8	20.6
White Leghorn ..	63	12,473	198.0	70.4	99.5	28.1
Barred Rock ..	38	6,458	169.9	58.7	82.2	29.0
Buff Rock ..	29	5,585	192.6	67.1	96.2	29.3
Light Sussex ..	28	5,621	200.7	80.9	93.6	26.2
All Breeds ..	644	124,748	193.7	81.4	90.7	21.6

TABLE III.

Number and Percentage of Special, First, and Second Grade Eggs for each Breed in respect of Pullets which completed the full 48-week Period.

BREED	EGGS LAID			PERCENTAGE DISTRIBUTION		
	Special Grade	First Grade	Second Grade	Special Grade	First Grade	Second Grade
White Wyandotte ..	23,191	22,701	4,629	% 45.9	% 44.9	% 9.2
Rhode Island Red ..	18,356	20,930	4,804	41.6	47.5	10.9
White Leghorn ..	4,433	6,270	1,770	35.5	50.3	14.2
Barred Rock ..	2,231	3,126	1,101	34.6	48.4	17.0
Buff Rock ..	1,946	2,790	849	34.8	50.0	15.2
Light Sussex ..	2,267	2,621	733	40.3	46.6	13.1
All Breeds ..	52,424	58,438	13,886	42.0	46.9	11.1

TABLE IV.

Number and Percentage of Pullets of each Breed which laid 200 First Grade Eggs and over, and not more than twenty per cent. Second Grade.

BREED	Number of Pullets for Full Period	Number of Pullets which laid 200 First Grade Eggs and over	Percentage of Pullets which laid 200 First Grade Eggs and over
White Wyandotte	253	102	% 40.3
Rhode Island Red	233	70	30.0
White Leghorn	63	22	34.9
Barred Rock	38	7	18.4
Buff Rock	29	6	20.7
Light Sussex	28	10	35.7
All Breeds	644	217	33.7

In addition to the 217 pullets mentioned in above Table, two White Wyandottes, one Rhode Island Red and one White Leghorn, which died during the Competition, laid 200 first grade eggs or over, and not more than 20 per cent. second grade.

TABLE V.

Average Weight of Egg for each Breed.

BREED	Total Number of Eggs Laid	Total Weight of Eggs	Average Weight of Egg	Average Weight Per Dozen
		<i>lb. oz. dr.</i>	<i>oz. dr.</i>	<i>oz.</i>
White Wyandotte ..	51,817	7,044 11 2	2 3	26.1
Rhode Island Red ..	47,006	6,350 2 11	2 3	25.9
White Leghorn ..	13,155	1,760 15 4	2 2	25.7
Barred Rock ..	6,915	914 14 0	2 2	25.4
Buff Rock ..	6,216	821 9 11	2 2	25.4
Light Sussex ..	5,831	781 11 15	2 2	25.7
All Breeds ..	130,940	17,674 0 11	2 3	25.9

TABLE VIII.

Average Egg Yield per Pullet during each of the Twelve
Four-Weekly Periods.

BREED	Number of Pullets for full period	Oct. 4-Oct. 31	Nov. 1-Nov. 28.	Nov. 29-Dec. 28	Dec. 27-Jan. 23	Jan. 24-Feb. 20	Feb. 21-Mar. 19	Mar. 20-Apr. 16	Apr. 17-May 14	May 15-June 11	June 12-July 9	July 10-Aug. 6	Aug. 7-Sept. 3	Average for full period
White Wyandotte	253	14.7	16.3	16.7	17.1	17.7	19.5	20.3	18.7	17.1	15.0	13.5	13.1	199.7
Rhode Island Red	233	13.6	14.5	15.1	15.0	16.2	19.2	20.7	19.6	16.8	13.9	12.7	11.9	189.2
White Leghorn	63	13.7	13.5	12.2	13.6	15.7	19.3	21.2	21.4	19.6	18.0	16.2	13.6	198.0
Barred Rock	33	10.6	12.9	11.7	11.0	11.8	16.6	19.7	18.9	17.6	14.9	12.6	11.6	160.9
Buff Rock	29	16.0	18.7	17.8	16.1	16.6	18.8	20.1	18.7	13.2	12.8	12.4	11.4	192.6
Light Sussex	23	16.4	16.0	15.2	17.6	18.1	18.3	19.8	19.7	17.3	15.6	13.1	13.6	200.7
All Breeds ...	644	14.1	15.3	15	15.6	16.6	19.0	20.5	19.4	17.1	14.8	13.3	12.6	193.7

TABLE IX.

Percentage Production for each Breed during each of the Twelve
Four-Weekly Periods.

BREED	Number of Pullets for full period	Oct. 4-Oct. 31	Nov. 1-Nov. 28	Nov. 29-Dec. 28	Dec. 27-Jan. 23	Jan. 24-Feb. 20	Feb. 21-Mar. 19	Mar. 20-Apr. 16	Apr. 17-May 14	May 15-June 11	June 12-July 9	July 10-Aug. 6	Aug. 7-Sept. 3
		%	%	%	%	%	%	%	%	%	%	%	%
White Wyandotte	253	7.3	8.2	8.4	8.5	8.9	9.7	10.2	9.4	8.5	7.5	6.8	6.6
Rhode Island Red	233	7.2	7.7	8.0	7.9	8.5	10.2	10.9	10.4	8.9	7.3	6.7	6.3
White Leghorn	63	6.9	6.8	6.2	6.9	7.9	9.7	10.7	10.8	9.9	9.1	8.2	6.9
Barred Rock	33	6.2	7.6	6.9	6.5	6.9	9.8	11.6	11.1	10.4	8.9	7.4	6.8
Buff Rock	29	8.3	9.7	9.2	8.4	8.7	9.7	10.5	9.8	6.8	6.6	6.4	5.9
Light Sussex	23	8.2	8.0	7.5	8.8	9.0	9.1	9.9	9.8	8.6	7.8	6.5	6.8
All Breeds ...	644	7.3	7.9	7.9	8.1	8.6	9.8	10.6	10.0	8.8	7.6	6.9	6.5

NOTE.—Eggs which were under the weight prescribed for second grade are not included in the calculations in Tables VIII and IX above.

TABLE X.

Average Number of First Grade Eggs per Pullet during the period 4th October to 3rd January, inclusive (92 days).

BREED	Number of Pullets	Number of First Grade Eggs	Average Number of First Grade Eggs per Pullet
White Wyandotte	262	11,168	42.6
Rhode Island Red	257	10,261	39.9
White Leghorn	70	2,006	28.6
Barred Rock	41	1,163	28.4
Buff Rock	35	1,597	45.6
Light Sussex	30	1,335	44.5
All Breeds	695	27,530	39.6

TABLE XI.

Pullets classified according to the number of First Grade Eggs laid from 4th October to 3rd January, inclusive (92 days).

BREED	Number of Pullets	Pullets not laying up to 3rd Jan.	FIRST GRADE EGGS					
			Under 30	30 and under 40	40 and under 60	60 and under 70	70 and under 80	80 to 81
White Wyandotte ...	262	6	78	19	79	51	25	4
Rhode Island Red ...	257	6	79	31	85	42	14	—
White Leghorn ...	70	1	37	9	16	7	—	—
Barred Rock ...	41	2	20	7	8	2	2	—
Buff Rock ...	35	8	8	1	17	6	2	1
Light Sussex* ...	30		9	4	7	7	3	—
All Breeds ...	695	15	231	71	212	115	46	5

TABLE XII.

Percentage Distribution of Pullets of each Breed according to the number of First Grade Eggs laid from 4th October to 3rd January, inclusive (92 days).

BREED	Pullets not laying up to 3rd Jan.	FIRST GRADE EGGS					
		Under 30	30 and under 40	40 and under 60	60 and under 70	70 and under 80	80 to 81
White Wyandotte	% 2.3	% 29.8	% 7.2	% 30.2	% 19.5	% 9.5	% 1.5
Rhode Island Red	2.3	30.7	12.1	33.1	16.3	5.5	—
White Leghorn	1.4	52.8	12.9	22.9	10.0	—	—
Barred Rock	4.8	48.8	17.1	19.5	4.9	4.9	—
Buff Rock	—	22.8	2.9	48.6	17.1	5.7	2.9
Light Sussex	—	30.0	13.4	23.3	23.3	10.0	—
All Breeds	2.2	33.2	10.2	30.5	16.6	6.6	0.7

SECTION PRIZES.

SECTION I.—WHITE WYANDOTTE.

NAME AND ADDRESS OF OWNER	Value of Eggs	Total No. of Eggs Laid	No. of Second Grade Eggs	Average No. of Eggs per Bird
<i>First Prize (£10).</i> Miss B. Quain, Anglesboro, Co. Limerick (via Mitchelstown).	£ s. d. 8 13 9½	1,536	20	256.0
<i>Second Prize (£7).</i> Mrs. C. P. Chearnley, Glendoneen, Ballinhassig, Co. Cork.	7 16 7½	1,359	94	226.5
<i>Third Prize (£5).</i> Mr. W. Fitzgerald, Glenboy House, Manorhamilton, Co. Leitrim.	7 6 7½	1,331	235	221.8
<i>Fourth Prize (£4).</i> Mrs. A. M. Murray, Tanderagee, Enfield, Co. Meath.	7 0 7	1,268	119	211.3
<i>Fifth Prize (£2).</i> Mr. M. Burchael, Kill, Co. Kildare.	6 19 2½	1,221	57	203.5

SECTION II.—WHITE WYANDOTTE (STATION HOLDERS).

NAME AND ADDRESS OF OWNER	Value of Eggs	Total No. of Eggs Laid	No. of Second Grade Eggs	Average No. of Eggs per Bird
<i>First Prize (£10).</i> Miss K. Newman, Drinadaly, Trim, Co. Meath.	£ s. d. 7 15 1	1,394	155	232.3
<i>Second Prize (£7).</i> Miss O'Keeffe, Ballyboden, Knocktopher, Co. Kilkenny.	7 11 4½	1,312	56	218.7
<i>Third Prize (£5).</i> Mrs. K. Mullen, Oristown, Ceanannus Mor, Co. Meath.	7 8 6½	1,320	124	220.0
<i>Fourth Prize (£4).</i> Miss M. O'Brien, Moycarkey, Thurles, Co. Tipperary.	7 8 4½	1,348	128	224.7

SECTION III.—RHODE ISLAND RED.

NAME AND ADDRESS OF OWNER	Value of Eggs	Total No. of Eggs Laid	No. of Second Grade Eggs	Average No. of Eggs per Bird
<i>First Prize (£10).</i> Miss D. A. Strong, Moate House, Kells (Ceanannus Mor), Co. Meath.	£ s. d. 7 10 11½	1,315	49	219.2
<i>Second Prize (£7).</i> Mrs. D. C. Chearnley, Salterbridge P.F., The Deeps, Wexford.	7 7 3½	1,360	177	226.7
<i>Third Prize (£5).</i> Mrs. N. McElligott, Bedford, Listowel, Co. Kerry.	7 3 1½	1,256	35	209.3
<i>Fourth Prize (£4).</i> Mrs. F. H. Kent, Curraghmore P.F., Borrisokane, Co. Tipperary.	6 18 5½	1,226	130	204.3

SECTION IV.—RHODE ISLAND RED (STATION HOLDERS).

NAME AND ADDRESS OF OWNER	Value of Eggs	Total No. of Eggs Laid	No. of Second Grade Eggs	Average No. of Eggs per Bird
<i>First Prize (£10).</i> Mrs. H. Bruce, Hill Brook, Birr, Offaly.	£ s. d. 7 9 0½	1,357	200	226.2
<i>Second Prize (£7).</i> Mrs. C. Healy, Beeing, Dromahane, Mallow, Co. Cork.	7 5 1½	1,341	118	223.5
<i>Third Prize (£5).</i> Miss M. O'Donovan, Dromore, Villierstown, Cappoquin, Co. Waterford.	7 3 6	1,259	128	209.8
<i>Fourth Prize (£4).</i> Mrs. B. Hart, Bettyfort, Clondalkin, Co. Dublin.	6 19 2	1,243	33	207.2

SECTION V.—ANY NON-SITTING BREED.

NAME AND ADDRESS OF OWNER	Value of Eggs	Breed	Total No. of Eggs Laid	No. of Second Grade Eggs	Average No. of Eggs per Bird
<i>First Prize (£10).</i> Mrs. M. A. Walsh, Wardstown, Athboy, Co. Meath.	£ s. d. 7 1 9½	White Leghorn	1,284	107	214.0
<i>Second Prize (£7).</i> Mrs. M. E. Shanley, Drumard, Dromod, Co. Leitrim.	6 17 5½	White Leghorn	1,279	186	213.2
<i>Third Prize (£5).</i> Rev. Bro. O'Rourke, Our Lady of Lourdes, Cahermoyle, Ardagh, Co. Limerick.	6 15 10	White Leghorn	1,252	192	208.7

SECTION VI.—ANY OTHER GENERAL PURPOSE BREED.

NAME AND ADDRESS OF OWNER	Value of Eggs	Breed	Total No. of Eggs Laid	No. of Second Grade Eggs	Average No. of Eggs per Bird
<i>First Prize (£10).</i> Mrs. M. Keatley, Bookfield, Ballytore, Co. Kildare.	£ s. d. 7 1 0½	Light Sussex	1,230	25	205.0
<i>Second Prize (£7).</i> Miss D. M. Place, Rosemount, New Ross, Co. Wexford.	7 0 2	Light Sussex	1,219	90	203.2
<i>Third Prize (£5).</i> Mrs. E. Naughton, Slattamore, Rooskey, Dromod, Co. Roscommon.	6 19 4½	Buff Rock	1,248	224	208.0
<i>Fourth Prize (£4).</i> Sister-in-Charge, Technical School, Stradbally, Laoighis.	6 15 0	Buff Rock	1,236	241	206.0

SPECIAL PRIZES.

The Special Prize of a Silver Cup (or its value, £10) for the *Pen* of pullets laying eggs of the highest market value during the Competition, has been awarded to Miss B. Quain, Anglesboro, Co. Limerick, via Mitchelstown, for Pen No. 5 (White Wyandotte) which laid 1,536 eggs, value £8 13s. 9½d., and which also won first prize in Section I.

The Special Prize of a Silver Medal (or its value, £2) for the *Pen* of pullets of non-sitting breed laying the highest average of first grade eggs per bird during the period 4th October to 3rd January, inclusive, has been awarded to Mrs. M. A. Walsh, Wardstown, Athboy, Co. Meath, for Pen No. 97 (White Leghorn), which laid 231 first grade eggs during this period.

The Special Prize of a Silver Medal (or its value, £2) for the *Pen* of pullets of sitting breed laying the highest average of first grade eggs per bird during the period 4th October to 3rd January, inclusive, has been awarded to Miss D. A. Strong, Moate House (Ceanannus Mor) Kells, Co. Meath, for Pen No. 46 (Rhode Island Red), which laid 382 first grade eggs during this period.

The Special Prize of a Silver Medal (or its value £2) for the *Individual Bird* of non-sitting breed laying the highest number of first grade eggs during the Competition has been awarded to Miss K. Cunningham, Monreade P.F., Naas, Co. Kildare, for Pullet No. 518 (Pen No. 90, White Leghorn) which laid 258 first grade eggs.

The Special Prize of a Silver Medal (or its value £2) for the *Individual Bird* of sitting breed laying the highest number of first grade eggs during the Competition has been awarded to Mrs. M. Keatley, Bookfield, Ballytore, Co. Kildare, for Pullet No. 710 (Pen 106, Light Sussex) which laid 289 first grade eggs.

The Special Prize of a Silver Medal (or its value £2) for the *Individual Bird* of non-sitting breed laying the highest number of first grade eggs during the period 4th October to 3rd January, inclusive, has been awarded to Miss E. M. O'Keeffe, St. Rita's Poultry Station, Lake Vale, Ballydesmond, Co. Cork, for Pullet No. 530 (Pen 92, White Leghorn) which laid 69 first grade eggs during this period.

The following three pullets tied for the Special Prize of a Silver Medal (or its value £2) for the *Individual Bird* of sitting breed laying the highest number of first grade eggs during the period 4th October to 3rd January, inclusive, with a score of 81 first grade eggs during this period:—

Pullet No. 218 (Pen 39, White Wyandotte), owned by Mrs. A. B. Barbour, Knockbeg House, Collooney, Co. Sligo.

Pullet No. 223 (Pen 40, White Wyandotte), owned by Miss M. Mulcahy, Abbeyview, Clonmel.

Pullet No. 632 (Pen 109, Buff Rock), owned by Mrs. K. MacCabe Derry, Aughamullen, Castleblayney, Co. Monaghan.

PULLETS WHICH QUALIFIED FOR COPPER RINGS.

The following Table gives particulars of the 203 pullets which laid 200 first grade eggs or over, and not more than 20 per cent. second grade.

TABLE XIII.

WHITE WYANDOTTE (94 Pullets).

Pen Number	Pullet Number	Number of Sealed Copper Ring	EGGS LAID				NAME AND ADDRESS OF OWNER
			Special Grade	First Grade	Second Grade	Total	
1	2	1,401	174	30	2	206	Miss A. G. Twigg, Greenwood, Malahide, Co. Dublin.
2	7	1,402	127	96	14	237	Mrs. M. Stanton, Woodlands, Glanmire, Co. Cork.
	12	1,403	151	65	3	219	
3	15	1,404	25	186	9	220	Mr. D. Hyland, Tully, Danagh, Kilfinane, Co. Limerick.
5	25	1,405	208	48	—	256	Miss B. Quain, Anglesboro', Co. Limerick (via Mitchelstown).
	26	1,406	33	239	5	277	
	27	1,407	64	197	7	268	
	28	1,408	216	30	1	247	
	30	1,409	48	201	7	256	
6	32	1,410	179	23	—	202	Rev. Bro. O'Rourke, Our Lady of Lourdes, Cahermoyle, Ardagh, Co. Limerick.
	33	1,411	216	11	—	227	
7	37	1,412	137	99	5	241	Mrs. E. M. O'Hara, Mornington, Crookedwood, Mullingar.
	39	1,413	177	41	2	220	
8	44	1,414	65	136	32	233	Mr. W. Fitzgerald, Glenboy House, Manorhamilton, Co. Leitrim.
	45	1,415	41	164	8	213	
	46	1,416	102	114	2	218	
9	49	1,417	110	106	—	216	Mrs. C. P. Chearnley, Glendoneen, Ballinhassig, Co. Cork.
	50	1,418	129	121	4	254	
	52	1,419	91	118	5	214	
	53	1,420	54	188	16	258	
11	61	1,421	77	146	6	229	Miss P. Alley, Hill Poultry Farm, Athboy, Co. Meath.
	62	1,422	102	105	1	208	
	64	1,423	202	5	1	208	

Pen Number	Pullet Number	Number of Sealed Copper Ring	EGGS LAID				NAME AND ADDRESS OF OWNER
			Special Grade	First Grade	Second Grade	Total	
12	67	1,424	194	25	—	219	Mrs. E. Hillis, Corrush, Doohamlet, Castleblaney, Co. Monaghan.
	69	1,425	194	20	—	214	
	70	1,426	156	99	3	258	
13	77	1,427	136	80	1	217	Mrs. J. R. Boyd, The Rectory, Killaloe, Co. Clare.
	78	1,428	131	115	8	254	
15	90	1,429	173	59	3	235	Mrs. M. O'Donnell, Porthall, Clonleigh, Lifford, Co. Donegal.
16	92	1,430	8	199	31	238	Rev. P. C. Brown, Templebreedy Rectory, Crosshaven, Co. Cork.
17	100	1,431	59	147	6	212	Mrs. A. M. Murray, Tanderagee, Enfield, Co. Meath.
18	106	1,432	180	24	—	204	Mr. W. Frazer, Twigs Park, Manorhamilton, Co. Leitrim.
	107	1,433	200	8	—	208	
19	109	1,434	195	43	—	238	Miss K. Newman, Drinadaly, Trim, Co. Meath.
	114	1,435	121	99	3	223	
20	115	1,436	95	152	3	250	Rev. P. C. Brown, Templebreedy Rectory, Crosshaven, Co. Cork.
	117	1,437	132	111	16	259	
	119	1,438	20	181	12	213	
21	124	1,439	78	136	13	227	Mr. W. Frazer, Twigs Park, Manorhamilton, Co. Leitrim.
22	127	1,440	147	76	18	241	Mrs. L. P. Cox, Victoria Park, Donnycarney, Co. Dublin.
	132	1,441	198	32	1	231	
23	697	1,442	208	14	—	222	Miss M. M. Bowe, Graigueavalla, Errill, Ballybrophy, Laoighis.
	699	1,443	139	65	2	206	
	701	1,444	173	58	1	232	

Pen Number	Pullet Number	Number of Sealed Copper Ring	EGGS LAID				NAME AND ADDRESS OF OWNER
			Special Grade	First Grade	Second Grade	Total	
24	475	1,445	218	4	1	223	Mr. M. Burchael, Kill, Co. Kildare.
	477	1,446	47	163	4	214	
	478	1,447	195	38	1	234	
25	706	1,448	15	222	2	239	Mrs. J. Foley, Moyhill House, Cratloe, Co. Clare.
	708	1,449	66	154	8	228	
26	139	1,450	195	19	—	214	Miss M. Byrne, Montivideo, Roscrea, Co. Tipperary.
	141	1,451	215	15	2	232	
27	146	1,452	20	219	12	251	Miss M. O'Brien, Moycarkey, Thurles, Co. Tipperary.
	147	1,453	91	125	8	224	
	148	1,454	133	80	—	213	
	150	1,455	121	130	2	253	
28	151	1,456	18	227	8	253	Mrs. K. Mullen, Oristown, Ceanannus Mor, Co. Meath.
	154	1,457	17	210	11	238	
	156	1,458	11	209	10	230	
29	160	1,459	41	161	5	207	Mrs. M. Connolly, Carrigamore, Corvalley, Dundalk, Co. Monaghan.
30	164	1,460	132	112	—	244	Miss K. Newman, Drinadaly, Trim, Co. Meath.
	168	1,461	17	213	10	240	
31	169	1,462	66	161	24	251	Miss O'Keefe, Ballybooden, Knocktopher, Co. Kilkenny.
	170	1,463	76	142	17	235	
	171	1,464	247	7	—	254	
32	177	1,465	201	42	2	245	Mrs. M. Lynch, Knockroe, Passage East, Co. Waterford.
	178	1,466	180	27	2	209	
	180	1,467	221	19	—	240	
33	183	1,468	5	212	21	238	Mrs. A. Ginnety, Castlebellingham, Co. Louth.
	185	1,469	212	8	—	220	
	186	1,470	89	160	4	253	
34	189	1,472	152	66	2	220	Miss C. M. Brogan, Phillistown House, Trim, Co. Meath.

Pen Number	Pullet Number	Number of Sealed Copper Ring	EGGS LAID				NAME AND ADDRESS OF OWNER
			Special Grade	First Grade	Second Grade	Total	
35	196	1,473	23	187	36	246	Miss M. Hally, The Cottage, Kells, Thomastown, Co. Kilkenny.
36	199	1,474	47	160	8	215	Mrs. M. Drohan, Ballynevin, Carrick-on-Suir, Co. Waterford.
	200	1,475	28	175	43	246	
	204	1,476	76	124	10	210	
38	212	1,477	170	34	3	207	Mr. M. Burchael, Kill, Co. Kildare.
	213	1,478	106	123	—	229	
	214	1,479	115	107	5	227	
	216	1,480	28	217	20	265	
39	219	1,481	206	4	—	210	Mrs. A. B. Barbour, Knockbeg House, Collooney, Co. Sligo.
	222	1,482	136	126	—	262	
40	223	1,483	182	69	—	251	Miss M. Mulcahy, Abbeyview, Clonmel, Co. Waterford.
	224	1,484	201	13	1	215	
	226	1,485	211	61	—	272	
	228	1,486	205	11	—	216	
41	230	1,487	182	22	—	204	Mrs. R. B. Eadie, The Poplars, Beaufort, Co. Kerry.
	233	1,488	41	209	12	262	
	234	1,489	156	74	—	230	
42	135	1,490	220	7	—	227	Mrs. M. E. Bailey, Gortboy House, Kilmallock, Co. Limerick.
	136	1,491	232	5	—	237	
	138	1,492	140	100	1	241	
43	241	1,493	231	8	—	239	Miss A. Hanly, Cappa House, Cahir, Co. Tipperary.
	243	1,494	176	28	—	204	
	244	1,495	181	25	2	208	

RHODE ISLAND RED (66 Pullets).

Pen Number	Pullet Number	Number of Sealed Copper Ring	EGGS LAID				NAME AND ADDRESS OF OWNER
			Special Grade	First Grade	Second Grade	Total	
45	238	1,496	181	78	—	259	Mrs. P. O'Reilly, St. Johnsfort, Ardee, Co. Meath.
46	253	1,497	157	73	—	230	Miss D. A. Strong, Moate House, Kells (Ceanannus Mor), Co. Meath.
	256	1,498	103	110	—	213	
	258	1,499	210	1	—	211	

Pen Number	Pullet Number	Number of Sealed Copper Ring	EGGS LAID				NAME AND ADDRESS OF OWNER
			Special Grade	First Grade	Second Grade	Total	
48	265	1,500	143	74	—	217	Mrs. D. C. Chearnley, Salterbridge P.F., The Deeps, Wexford.
	266	1,501	157	76	1	234	
	267	1,502	46	170	11	227	
	268	1,503	48	179	9	236	
50	278	1,504	186	42	—	228	Captain H. M. S. Redmond, Popefield, Athy, Laoighis.
	279	1,505	167	46	—	213	
51	316	1,506	226	5	—	231	Rev. Bro. Dominick, Agricultural College, Mountbellew, Co. Galway.
52	293	1,507	28	193	14	235	Mrs. S. K. Harris, Ballingaddy, Kilmallock, Co. Limerick.
53	300	1,508	39	174	22	235	Mrs. M. A. Miller, Millview, Rathowen, Co. Longford.
54	301	1,509	35	178	7	220	Miss M. Cunningham, Foxhall, Ardmore, Youghal, Co. Cork
55	309	1,510	146	73	2	221	Mrs. E. M. Dennehy, Ballymanus, Stradbally, Laoighis.
56	284	1,511	179	72	—	251	Mrs. K. Earl, Grantstown House, Waterford.
	288	1,512	42	197	27	266	
58	328	1,513	45	183	21	249	Mrs. F. H. Kent, Curraghmore P.F., Borrisokane, Co. Tipperary.
59	332	1,514	38	172	17	227	Mrs. E. Loughrey, Drumumna, Crusheen, Ennis, Co. Clare.
	335	1,515	18	187	40	245	
60	342	1,516	75	125	12	212	Captain H. M. S. Redmond, Popefield, Athy, Laoighis.
61	346	1,517	27	174	13	214	Mrs. K. Earl, Grantstown House, Waterford.

Pen Number	Pullet Number	Number of Sealed Copper Ring	EGGS LAID				NAME AND ADDRESS OF OWNER
			Special Grade	First Grade	Second Grade	Total	
62	484	1,518	182	38	4	224	Mrs. B. M. Rafter, Knockthomas, Nurney, Bagenalstown, Co. Carlow.
64	493	1,519	209	4	—	213	Miss S. D. Deane, Longraigue, Foulksmills, Co. Wexford.
	496	1,520	166	67	2	235	
	497	1,521	185	27	—	212	
65	691	1,522	82	147	13	242	Mrs. N. McElligott, Bedford, Listowel, Co. Kerry.
	693	1,523	38	175	14	227	
	696	1,524	214	1	—	215	
66	358	1,525	64	147	2	213	Mr. W. Murphy, Skeeter Park, Cleariestown, Co. Wexford.
	360	1,526	107	172	—	279	
67	363	1,527	15	191	28	234	Mrs. C. Healy, Beeing, Dromahane, Mallow, Co. Cork.
	364	1,528	180	49	11	240	
	365	1,529	29	186	28	243	
	366	1,530	128	90	1	219	
68	368	1,531	65	146	3	214	Mrs. E. Loughrey, Drumumna, Crusheen, Ennis, Co. Clare.
69	373	1,532	122	95	—	217	Mrs. H. Langrell, Killinure, Tullow, Co. Wicklow.
	376	1,533	157	45	3	205	
70	382	1,534	101	104	1	206	Miss J. Rowe, Moylew P.F., Crossmolina, Co. Mayo.
71	385	1,535	120	89	2	211	Mrs. M. Cummins, Tullogher, New Ross, Co. Kilkenny.
72	394	1,536	194	34	—	228	Mrs. E. M. O'Flynn, Prohurst, Milford, Charleville, Co. Cork
	396	1,537	170	45	2	217	
73	400	1,538	96	130	3	229	Mrs. P. O'Reilly, St. Johnsfort, Ardee, Co. Meath.
	401	1,539	9	198	39	246	

Pen Number	Pullet Number	Number of Sealed Copper Ring	EGGS LAID				NAME AND ADDRESS OF OWNER
			Special Grade	First Grade	Second Grade	Total	
74	404	1,540	69	140	1	210	Mr. P. Meegan, Drummonreagh, Broomfield, Castleblayney, Co. Monaghan.
75	411	1,541	186	35	—	221	Mrs. A. R. Ferguson, Cloghboley, Co. Sligo.
77	423	1,542	80	146	25	251	Captain O. E. Webb, Blackhall, Kilcullen, Co. Kildare.
	424	1,543	48	175	8	231	
	425	1,544	203	16	—	219	
78	429	1,545	197	15	—	212	Miss M. O'Donovan, Dromore, Villierstown, Cappoquin, Co. Waterford.
	430	1,546	115	106	7	228	
	431	1,583	114	86	4	204	
	432	1,547	4	253	31	288	
79	436	1,548	46	163	16	225	Mrs. J. McCarthy, Caherelly Castle, Grange, Kilmallock, Co. Limerick.
80	439	1,549	110	110	—	220	Mrs. M. Doyle, Coolmanagh, Hacketstown, Co. Carlow.
	440	1,550	46	175	10	231	
81	445	1,551	163	90	—	253	Mrs. H. Bruce, Hill Brook, Birr, Offaly.
	446	1,552	246	10	—	256	
	449	1,553	193	31	—	224	
82	451	1,554	39	169	7	215	Mrs. M. Cruite, Tulla, Three Castles, Co. Kilkenny.
83	457	1,555	27	216	32	275	Mrs. B. Hart, Bettyfort, Clondalkin, Co. Dublin.
	458	1,556	213	2	1	216	
	459	1,557	181	39	—	220	
86	502	1,558	34	175	12	221	Miss T. Harvey, Northfield House, Connolly, Ennis, Co. Clare.
87	353	1,559	177	38	—	215	Mrs. E. M. Hodgins, Dangan, Roscrea, Co. Tipperary.
	354	1,560	17	218	24	259	

WHITE LEGHORN (21 Pullets).

Pen Number	Pullet Number	Number of Sealed Copper Ring	EGGS LAID				NAME AND ADDRESS OF OWNER
			Special Grade	First Grade	Second Grade	Total	
88	506	1,701	183	33	3	219	Mrs. K. Lysaght, Hazelwood, Mallow, Co. Cork.
89	511	1,702	167	75	—	242	Rev. Bro. O'Rourke, Our Lady of Lourdes, Cahermoyle, Ardagh, Co. Limerick.
	514	1,703	118	107	10	235	
	515	1,704	73	133	16	222	
90	518	1,705	23	235	30	288	Miss K. Cunningham, Monreade P.F., Naas, Co. Kildare.
	522	1,706	55	148	14	217	
91	524	1,707	67	141	6	214	Miss L. Gould, Derryhoo, Milltown, Belturbet, Co. Cavan.
92	530	1,708	222	5	—	227	Miss E. M. O'Keeffe, St. Rita's Poultry Station, Lakevale, Bally- desmond, Co. Cork.
	531	1,709	189	12	—	201	
	534	1,710	163	43	—	206	
93	537	1,711	133	82	4	219	Mrs. M. E. Higgins, Carramarla Lodge, Claremorris, Co. Mayo.
94	542	1,712	39	164	6	209	Mrs. L. Burke, Santry Hall, Santry, Co. Dublin.
	544	1,713	69	151	8	228	
97	562	1,714	114	119	6	239	Mrs. M. A. Walsh, Wardstown, Athboy, Co. Meath.
	563	1,715	55	173	13	241	
	564	1,716	97	135	12	244	
98	555	1,717	57	165	27	249	Mrs. M. E. Shanley, Drumard, Dromod, Co. Leitrim.
	556	1,718	153	55	—	208	
	558	1,719	14	202	21	237	
100	572	1,720	73	127	18	218	Mrs. K. Mulcahy, Ballinahown, Ardagh, Co. Limerick.
	576	1,721	179	42	1	222	

BARRED ROCK (6 Pullets).

Pen Number	Pullet Number	Number of Sealed Copper Ring	EGGS LAID				NAME AND ADDRESS OF OWNER
			Special Grade	First Grade	Second Grade	Total	
107	621	1,561	206	27	—	233	Mrs. M. A. Kelly, Carronstown, Ballivor, Co. Meath.
	622	1,562	156	78	1	235	
	623	1,563	197	15	—	212	
108	629	1,564	129	132	4	265	Mrs. E. A. Henderson, Ardrum, Inniscarra, Co. Cork.
111	648	1,565	162	41	1	204	Miss B. Power, Slieverue, Butlerstown, Co. Waterford.
112	650	1,566	68	154	5	227	Miss M. J. Hamilton, New Row, Clonleigh, Lifford, Co. Donegal.

BUFF ROCK (6 Pullets).

Pen Number	Pullet Number	Number of Sealed Copper Ring	EGGS LAID				NAME AND ADDRESS OF OWNER
			Special Grade	First Grade	Second Grade	Total	
102	580	1,567	67	181	18	266	Sister-in-Charge, Technical Schools, Stradbally, Laoighis.
109	632	1,568	95	155	4	254	Mrs. K. McCabe, Derry, Aughnamullen, Castleblayney, Co. Monaghan.
110	642	1,569	155	71	—	226	Mrs. E. Kennedy, Ballyroe, Freshford, Co. Kilkenny.
116	675	1,570	25	188	17	230	Mrs. E. Naughton, Slattamore, Rooskey, Dromod, Co. Roscommon.
	676	1,571	48	184	7	239	
	677	1,572	72	167	6	245	

LIGHT SUSSEX (10 Pullets).

Pen Number	Pullet Number	Number of Sealed Copper Ring	EGGS LAID				NAME AND ADDRESS OF OWNER
			Special Grade	First Grade	Second Grade	Total	
103	595	1,573	214	14	—	228	Miss D. M. Place, Rosemount, New Ross, Co. Wexford.
	596	1,574	28	190	7	225	
	598	1,575	95	125	20	240	
106	710	1,576	217	72	1	290	Mrs. M. Keatley, Bookfield, Ballytore, Co. Kildare.
	713	1,577	173	44	—	217	
	714	1,578	100	129	5	234	
113	637	1,579	168	61	3	232	Mrs. E. M. Perceval, Temple House, Ballymote, Co. Sligo.
	658	1,580	136	71	3	210	
117	681	1,581	207	33	—	240	Miss P. Alley, Hill Poultry Farm, Athboy, Co. Meath.
	682	1,582	150	58	2	210	

CERTIFICATES OF MERIT.

Certificates were awarded as follows :—

- (a) A Special Certificate for individual birds laying 220 first grade eggs or over.
- (b) A First Class Certificate for individual birds laying 200 but less than 220 first grade eggs.
- (c) A Second Class Certificate for individual birds laying less than 200, but over 170 first grade eggs.

Individual birds which produced deformed or thin-shelled eggs or more than twenty per cent. of second grade eggs were ineligible for Certificates.

The following Tables give particulars of the number of eggs laid by individual birds which qualified for Certificates, together with the Class of Certificate awarded in each case :—

TABLE XIV.
SECTION I.—WHITE WYANDOTTE.

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
Miss A. G. Twigg, Greenwood, Malahide, Co. Dublin.	1	2	204	2	206	First Second Second
		3	173	12	185	
		5	189	—	189	
Mrs. M. Stanton, Woodlands, Glanmire, Co. Cork.	2	7	223	14	237	Special Second Second First
		8	176	1	177	
		11	171	2	173	
		12	216	3	219	
Mr. D. Hyland, Tully, Danagh, Kilfinane, Co. Limerick.	3	15	211	9	220	First Second Second Second
		16	198	6	204	
		17	188	12	200	
		18	180	10	190	
Mrs. M. Strong, Moate House, Ceanannus Mór, Co. Meath.	4	21	173	1	174	Second
Miss B. Quain, Anglesboro', Co. Limerick, via Mitchelstown.	5	25	256	—	256	Special
		26	272	5	277	Special
		27	261	7	268	Special
		28	246	1	247	Special
		29	232	—	232	Special
		30	249	7	256	Special

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
Rev. Bro. O'Rourke, Our Lady of Lourdes, Cahermoyle, Ardagh, Co. Limerick.	6	31	198	26	224	Second
		32	202	—	202	First
		33	227	—	227	Special
		34	194	4	198	Second
		36	199	6	205	Second
Mrs. E. M. O'Hara, Mornington, Crookedwood, Mullingar, Co. Westmeath.	7	37	236	5	241	Special
		38	174	10	184	Second
		39	218	2	220	First
		40	192	—	192	Second
		41	186	—	186	Second
Mr. W. Fitzgerald, Glenboy House, Manorhamilton, Co. Leitrim.	8	43	181	42	223	Second
		44	201	32	233	First
		45	205	8	213	First
		46	216	2	218	First
Mrs. C. P. Chearnley, Glendoneen, Ballinhassig, Co. Cork.	9	49	216	—	216	First
		50	250	4	254	Special
		51	194	12	206	Second
		52	209	5	214	First
		53	242	16	258	Special
Mrs. L. P. Cox, Victoria Park, Donnycarney, Co. Dublin.	10	55	194	4	198	Second
		57	180	12	192	Second
		58	194	26	220	Second
Miss P. Alley, Hill Poultry Farm, Athboy, Co. Meath.	11	61	223	6	229	Special
		62	207	1	208	First
		64	207	1	208	First
		66	173	38	211	Second
Mrs. E. Hillis, Corrush, Doohamlet, Castleblayney, Co. Monaghan.	12	67	219	—	219	First
		69	214	—	214	First
		70	255	3	258	Special
Mrs. J. R. Boyd, The Rectory, Killaloe, Co. Clare.	13	75	186	—	186	Second
		77	216	1	217	First
		78	246	8	254	Special
Mr. D. J. MacArthur, Breemount House, Laracor, Trim, Co. Meath.	14	81	193	12	205	Second
		83	192	26	218	Second
Mrs. M. O'Donnell, Porthall, Clonleigh, Lifford, Co. Donegal.	15	88	189	—	189	Second
		90	232	3	235	Special

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
Rev. P. C. Brown, Templebreedy Rectory, Crosshaven, Co. Cork.	16	92	207	31	238	First
		93	198	—	198	Second
		94	172	2	174	Second
		95	184	3	187	Second
Mrs. A. M. Murray, Tanderagee, Enfield, Co. Meath.	17	97	199	39	238	Second
		98	192	2	194	Second
		100	206	6	212	First
		101	174	5	179	Second
Mr. W. Frazer, Twigs Park, Manorhamilton, Co. Leitrim.	18	104	190	17	207	Second
		105	193	1	194	Second
		106	204	—	204	First
		107	208	—	208	First
Miss K. Newman, Drinadaly, Trim, Co. Meath.	19	109	238	—	238	Special
		113	171	8	179	Second
		114	220	3	223	Special
Rev. P. C. Brown, Templebreedy Rectory, Crosshaven, Co. Cork.	20	115	247	3	250	Special
		117	243	16	259	Special
		119	201	12	213	First
		120	191	—	191	Second
Mr. W. Frazer, Twigs Park, Manorhamilton, Co. Leitrim.	21	122	176	2	178	Second
		124	214	13	227	First
		125	193	—	193	Second
		126	198	—	198	Second
Mrs. L. P. Cox, Victoria Park, Donnycarney, Co. Dublin.	22	127	223	18	241	Special
		132	230	1	231	Special
Miss M. M. Bowe, Graigueavalla, Errill, Ballybrophy, Laoighis.	23	697	222	—	222	Special
		698	178	2	180	Second
		699	204	2	206	First
		701	231	1	232	Special
Mr. M. Burchael, Kill, Co. Kildare.	24	475	222	1	223	Special
		477	210	4	214	First
		478	233	1	234	Special
		480	180	1	181	Second

SECTION II.—WHITE WYANDOTTE (STATION HOLDERS).

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
Mrs. J. Foley, Moyhill House, Cratloe, Co. Clare.	25	706	237	2	239	Special
		708	220	8	228	Special

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
Miss M. Byrne, Montevideo, Roscrea, Co. Tipperary.	26	139	214	—	214	First Special Second
		141	230	2	232	
		142	197	1	198	
Miss M. O'Brien, Moycarkey, Thurles, Co. Tipperary.	27	146	239	12	251	Special First First Special
		147	216	8	224	
		148	213	—	213	
		150	251	2	253	
Miss K. Mullen, Oristown, Ceanannus Mór, Co. Meath.	28	151	245	8	253	Special Second Special Second Special
		153	186	8	194	
		154	227	11	238	
		155	186	37	223	
		156	220	10	230	
Mrs. M. Connolly, Carrigamore, Corvalley, Dundalk, Co. Monaghan.	29	160	202	5	207	First
Miss K. Newman, Drinadaly, Trim, Co. Meath.	30	164	244	—	244	Special Second Second Special
		165	183	10	193	
		167	196	8	204	
		168	230	10	240	
Miss O'Keeffe, Ballyboden, Knocktopher, Co. Kilkenny.	31	169	227	24	251	Special First Special Second Second Second
		170	218	17	235	
		171	254	—	254	
		172	181	—	181	
		173	184	9	193	
		174	192	6	198	
Mrs. M. Lynch, Knockroe, Passage East, Co. Waterford.	32	177	243	2	245	Special First Special
		178	207	2	209	
		180	240	—	240	
Mrs. A. Ginnety, Castlebellingham, Co. Louth.	33	183	217	21	238	First Special Special
		185	220	—	220	
		186	249	4	253	
Miss C. M. Brogan, Phillistown House, Trim, Co. Meath.	34	187	212	5	217	First Second First
		188	173	1	174	
		189	218	2	220	
Miss M. Hally The Cottage, Kells, Thomastown, Co. Kilkenny.	35	195	188	4	192	Second First
		196	210	36	246	

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
Mrs. M. Drohan, Ballynevin, Carrick-on-Suir, Co. Waterford.	36	199	207	8	215	First
		200	203	43	246	First
		204	200	10	210	First
Miss M. M. Bowe, Graigueavalla, Errill, Ballybrophy, Laoighis.	37	205	174	1	175	Second
		206	183	—	183	Second
		208	176	—	176	Second
Mr. M. Burchael, Kill, Co. Kildare.	38	212	204	3	207	First
		213	229	—	229	Special
		214	222	5	227	Special
		215	181	2	183	Second
		216	245	20	265	Special
Mrs. A. B. Barbour, Knockbeg House, Collooney, Co. Sligo.	39	219	210	—	210	First
		222	262	—	262	Special
Miss M. Mulcahy, Abbeyview, Clonmel, Co. Waterford.	40	223	251	—	251	Special
		224	214	1	215	First
		225	177	—	177	Second
		226	272	—	272	Special
		228	216	—	216	First
Mrs. R. B. Eadie, The Poplars, Beaufort, Co. Kerry.	41	230	204	—	204	First
		231	183	3	186	Second
		233	250	12	262	Special
		234	230	—	230	Special
Mrs. M. E. Bailey, Gortboy House, Kilmallock, Co. Limerick.	42	135	227	—	227	Special
		136	237	—	237	Special
		138	240	1	241	Special
Miss A. Hanly, Cappa House, Cahir, Co. Tipperary	43	241	239	—	239	Special
		242	198	4	202	Second
		243	204	—	204	First
		244	206	2	208	First

SECTION III.—RHODE ISLAND RED.

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
Mrs. P. O'Reilly, St. Johnsfors, Ardee, Co. Meath.	45	238	259	—	259	Special

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
Miss D. A. Strong, Moate House, Kells (Ceanannus Mór), Co. Meath.	46	253	230	—	230	Special Special First First First
		255	231	—	231	
		256	213	—	213	
		257	218	—	218	
		258	211	—	211	
Miss S. M. Cooke, Aske, Gorey, Co. Wexford.	47	260	187	4	191	Second
Mrs. D. C. Chearnley, Salter Bridge Poultry Farm, The Deeps, Wexford.	48	265	217	—	217	First Special First Special
		266	233	1	234	
		267	216	11	227	
		268	227	9	236	
Mrs. E. M. O'Flynn, Prohurst, Milford, Charleville, Co. Cork.	49	272	173	—	173	Second Second Second
		274	184	12	196	
		275	180	—	180	
Capt. H. M. S. Redmond, Popefield, Athy, Laoighis.	50	277	176	2	178	Second Special First Second
		278	228	—	228	
		279	213	—	213	
		281	185	—	185	
Rev. Bro. Dominick, Agricultural College, Mount Bellew, Co. Galway.	51	313	198	—	198	Second Second Special
		315	193	—	193	
		316	231	—	231	
Mrs. S. K. Harris, Ballingaddy, Kilmallock, Co. Limerick.	52	291	175	—	175	Second Special
		293	221	14	235	
Mrs. M. A. Miller, Millview, Rathowen, Co. Longford.	53	296	196	1	197	Second Second First
		298	186	4	190	
		300	213	22	235	
Miss M. Cunningham, Foxhall, Ardmore, Youghal, Co. Cork.	54	301	213	7	220	First
Mrs. E. M. Dennehy, Ballymanus, Stradbally, Laoighis.	55	309	219	2	221	First Second Second
		311	189	3	192	
		312	176	—	176	
Mrs. K. Earl, Grantstown House, Waterford.	56	283	179	2	181	Second Special Special
		284	251	—	251	
		288	239	27	266	

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
Mrs. C. L. Cardew, Castlefigerty, Thurles, Co. Tipperary.	57	323	176	15	191	Second
		324	182	20	202	Second
Mrs. F. H. Kent, Curraghmore Poultry Farm, Borrisokane, Co. Tipperary.	58	325	193	1	194	Second
		328	228	21	249	Special
Mrs. E. Loughrey, Drumumna, Crusheen, Ennis, Co. Clare.	59	332	210	17	227	First
		335	205	40	245	First
Capt. H. M. S. Redmond, Popefield, Athy, Laoighis.	60	338	177	—	177	Second
		339	195	—	195	Second
		342	200	12	212	First
Mrs. K. Earl, Grantstown House, Waterford.	61	343	195	—	195	Second
		345	195	8	203	Second
		346	201	13	214	First
		347	196	1	197	Second
Mrs. B. M. Rafter, Knockthomas, Nurney, Bagenalstown, Co. Carlow.	62	484	220	4	224	Special
		486	177	—	177	Second
Mrs. E. M. Dennehy, Ballymanus, Stradbally, Laoighis.	63	491	194	—	194	Second
Miss S. D. Deane, Longraigue, Foulksmills, Co. Wexford.	64	493	213	—	213	First
		494	174	—	174	Second
		496	233	2	235	Special
		497	212	—	212	First
Mrs. N. McElligott, Bedford, Listowel, Co. Kerry.	65	691	229	13	242	Special
		692	184	2	186	Second
		693	213	14	227	First
		694	194	—	194	Second
		695	186	6	192	Second
		696	215	—	215	First

SECTION IV.—RHODE ISLAND RED. (STATION HOLDERS).

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
Mr. W. Murphy Skeeter Park, Clearestown, Co. Wexford.	66	357	198	6	204	Second
		358	211	2	213	First
		360	279	—	279	Special
Mrs. C. Healy, Beeing, Dromahane, Mallow, Co. Cork.	67	362	185	44	229	Second
		363	206	28	234	First
		364	229	11	240	Special
		365	215	28	243	First
		366	218	1	219	First
Mrs. E. Loughrey, Drumumna, Crusheen, Ennis, Co. Clare.	68	367	206	10	216	First
		368	211	3	214	First
		370	192	32	224	Second
		371	172	1	173	Second
Mrs. H. Langrell, Killinure, Tullow, Co. Wicklow.	69	373	217	—	217	First
		376	202	3	205	First
		377	187	6	193	Second
Miss J. Rowe, Moylaw Poultry Farm, Crossmolina, Co. Mayo.	70	382	205	1	206	First
Mrs. M. Cummins, Tullagher, New Ross, Co. Kilkenny.	71	385	209	2	211	First
Mrs. E. M. O'Flynn, Prohurst, Milford, Charleville, Co. Cork.	72	392	190	43	233	Second
		393	199	1	200	Second
		394	228	—	228	Special
		396	215	2	217	First
Mrs. P. O'Reilly, St. Johnsfort, Ardee, Co. Meath.	73	400	226	3	229	Special
		401	207	39	246	First
		402	173	2	175	Second
Mr. P. Meegan, Drummonreagh, Broomfield, Castleblayney, Co. Monaghan.	74	403	177	2	179	Second
		404	209	1	210	First
		405	173	4	177	Second
		406	180	2	182	Second
Mrs. A. R. Ferguson, Cloghboley, Co. Sligo.	75	411	221	—	221	Special

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
Mrs. M. F. Smith, Bridge House, Bettystown, Co. Meath.	76	417	183	27	210	Second Second
		419	173	3	176	
Captain O. E. Webb, Blackhall, Kilcullen, Co. Kildare.	77	423	226	25	251	Special Special First
		424	223	8	231	
		425	219	—	219	
Miss M. O'Donovan, Dromore, Villierstown, Cappoquin, Co. Waterford.	78	429	212	—	212	First Special First Special
		430	221	7	228	
		431	200	4	204	
		432	257	31	288	
Mrs. J. McCarthy, Caherelly Castle, Grange, Kilmallock, Co. Limerick.	79	436	209	16	225	First Second
		437	193	44	237	
Mrs. M. Doyle, Coolmanagh, Hacketstown, Co. Carlow.	80	439	220	—	220	Special Special Second
		440	221	10	231	
		441	174	3	177	
Mrs. H. Bruce, Hill Brook, Birr, Offaly.	81	445	253	—	253	Special Special Second Special
		446	256	—	256	
		448	191	1	192	
		449	224	—	224	
Mrs. M. Cruite, Tulla, Three Castles, Co. Kilkenny.	82	451	208	7	215	First
Mrs. B. Hart, Bettyfort, Clondalkin, Co. Dublin.	83	457	243	32	275	Special First Special Second Second
		458	215	1	216	
		459	220	—	220	
		460	174	—	174	
		461	190	—	190	
Mrs. M. Smith, Kileloon, Dunboyne, Co. Meath.	84	467	182	2	184	Second Second
		468	179	5	184	
Mrs. M. Costello, Duagh, Kilmorna, Co. Kerry.	85	470	181	—	181	Second
Miss T. Harvey, Northfield House, Connolly, Ennis, Co. Clare.	86	502	209	12	221	First

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
Mrs. E. M. Hodgins, Dangan, Roscrea, Co. Tipperary.	87	349	180	—	180	Second
		351	187	16	203	Second
		352	189	6	195	Second
		353	215	—	215	First
		354	235	24	259	Special

SECTION V.—ANY NON-SITTING BREED.

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
<i>White Leghorn.</i> Mrs. K. Lysaght, Hazlewood, Mallow, Co. Cork.	88	505	189	7	196	Second
		506	216	3	219	First
		507	198	8	206	Second
		510	183	9	192	Second
<i>White Leghorn.</i> Rev. Bro. O'Rourke, Our Lady of Lourdes, Cahermoyle, Ardagh, Co. Limerick.	89	511	242	—	242	Special
		513	227	—	227	Special
		514	225	10	235	Special
		515	206	16	222	First
<i>White Leghorn.</i> Miss K. Cunningham, Monreade P.F., Naas, Co. Kildare.	90	518	258	30	288	Special
		520	196	45	241	Second
		522	203	14	217	First
<i>White Leghorn.</i> Miss L. Gould, Derryhoo, Milltown, Belturbet, Co. Cavan.	91	524	208	6	214	First
		526	191	13	204	Second
<i>White Leghorn.</i> Miss E. M. O'Keeffe, St. Rita's Poultry Station, Lake Vale, Ballydesmond, Co. Cork.	92	530	227	—	227	Special
		531	201	—	201	First
		533	192	3	195	Second
		534	206	—	206	First
<i>White Leghorn.</i> Mrs. M. E. Higgins, Carramarla Lodge, Claremorris, Co. Mayo.	93	537	215	4	219	First.
<i>White Leghorn.</i> Mrs. L. Burke, Santry Hall, Santry, Co. Dublin.	94	542	203	6	209	First
		544	220	8	228	Special

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
<i>White Leghorn.</i> Miss P. Alley, Hill Poultry Farm, Athboy, Co. Meath.	96	565 570	193 196	11 —	204 196	Second Second
<i>White Leghorn.</i> Mrs. M. A. Walsh, Wardstown, Athboy, Co. Meath.	97	561 562 563 564	194 233 228 232	— 6 13 12	194 239 241 244	Second Special Special Special
<i>White Leghorn.</i> Mrs. M. E. Shanley, Drumard, Dromod, Co. Leitrim.	98	553 555 556 558	181 222 208 216	10 27 — 21	191 249 208 237	Second Special First First
<i>White Leghorn.</i> Mrs. K. Mulcahy, Ballinahown, Ardagh, Co. Limerick.	100	572 573 575 576	200 185 182 221	18 6 1 1	218 191 183 222	First Second Second Special

SECTION VI.—ANY OTHER GENERAL PURPOSE BREED.

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
<i>Barred Rock.</i> Mrs. M. A. Kelly, Carronstown, Ballivor, Co. Meath.	107	620 621 622 623	198 233 234 212	— — 1 —	198 233 235 212	Second Special Special First
<i>Barred Rock.</i> Mrs. E. A. Henderson, Ardrum, Inniscarra, Co. Cork.	108	628 629	176 261	18 4	194 265	Second Special
<i>Barred Rock.</i> Miss B. Power, Slieverue, Butlerstown, Co. Waterford.	111	644 648	174 203	3 1	177 204	Second First
<i>Barred Rock.</i> Miss M. J. Hamilton, New Row, Clonleigh, Lifford, Co. Donegal.	112	650 651	222 199	5 5	227 204	Special Second

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
<i>Buff Rock.</i> Mrs. M. Ffrench, Pouffaille, New Ross. Co. Wexford.	101	587	178	27	205	Second
<i>Buff Rock.</i> Sister-in-Charge, Technical School, Stradbally, Laoighis.	102	578 579 580 582	198 191 248 172	— 1 18 27	198 192 266 199	Second Second Special Second
<i>Buff Rock.</i> Miss M. Walsh, Tullamore, Listowel, Co. Kerry.	104	602	180	—	180	Second
<i>Buff Rock.</i> Mrs. K. MacCabe, Derry, Aughnamullen, Castleblayney, Co. Monaghan.	109	632 634 635	250 184 175	4 1 2	254 185 177	Special Second Second
<i>Buff Rock.</i> Mrs. E. Kennedy, Ballyroe, Freshford, Co. Kilkenny.	110	639 642	176 226	39 —	215 226	Second Special
<i>Buff Rock.</i> Mrs. E. Naughton, Slattamore, Rooskey, Dromod, Co. Roscommon.	116	674 675 676 677	192 213 232 239	20 17 7 6	212 230 239 245	Second First Special Special
<i>Light Sussex.</i> Miss D. M. Place, Rosemount, New Ross, Co. Wexford.	103	595 596 598 599 600	228 218 220 183 177	— 7 20 1 3	228 225 240 184 180	Special First Special Second Second
<i>Light Sussex.</i> Mrs. M. Keatley, Bookfield, Ballytore, Co. Kildare.	106	709 710 713 714	176 289 217 229	1 1 — 5	177 290 217 234	Second Special First Special
<i>Light Sussex.</i> Mrs. E. M. Perceval, Temple House, Ballymote, Co. Sligo.	113	657 658	229 207	3 3	232 210	Special First

NAME AND ADDRESS OF OWNER	Pen No.	Pullet No.	EGGS LAID			Class of Certificate awarded
			First Grade	Second Grade	Total	
<i>Light Sussex.</i> Rev. J. R. O'Rourke, Blacklion Poultry Farm, Blue Ball, Tullamore, Offaly.	115	667 669 670 672	185 185 180 191	4 37 9 13	189 222 189 204	Second Second Second Second
<i>Light Sussex.</i> Miss P. Alley, Hill Poultry Farm, Athboy, Co. Meath.	117	681 682	240 208	— 2	240 210	Special First

TABLE XV.

Number and Percentage of Pullets of each Breed which qualified for
Certificates of Merit.

Breed	Number of Pullets for full Period	Number of Certificates Awarded	Percentage of Pullets awarded Certificates	Percentage Distribution		
				Special	First Class	Second Class
			%	%	%	%
White Wyandotte	253	152	60.1	21.0	17.0	22.1
Rhode Island Red	233	121	51.9	13.3	16.3	22.3
White Leghorn	63	34	54.0	17.5	17.5	19.0
Barred Rock	38	10	26.3	10.5	5.3	10.5
Buff Rock	29	15	51.7	17.2	3.5	31.0
Light Sussex	28	17	60.7	21.4	14.3	25.0
All Breeds	644	349	54.2	17.1	15.4	21.7

TABLE XVI.

The following Table gives the number of pullets that died during the Competition, and the cause of death in each case :—

Date of Death	Number of Pullet	Number of Pen	Breed	Cause of Death
1935				
Oct. 26	508	88	White Leghorn	Gout.
" 31	317	51	Rhode Island Red	Haemorrhage and peritonitis following injury to cloaca.
Nov. 2	159	29	White Wyandotte	Peritonitis following inflammation of the oviduct.
" 13	547	95	White Leghorn	Peritonitis.
" 27	624	107	Barred Rock	Congestion of the lungs.
" 27	71	12	White Wyandotte	Inflammation of the oviduct and peritoneum.
Dec. 6	640	110	Buff Rock	Leukaemia.
1936				
Jan. 27	341	60	Rhode Island Red	Peritonitis following inflammation of the egg passage.
Feb. 27	482	62	Rhode Island Red	Chronic peritonitis resulting from infection of the oviduct.
Mar. 10	683	117	Light Sussex	Acute peritonitis following inflammation of the egg passage.
" 23	390	71	Rhode Island Red	Leukaemia.
" 23	398	73	Rhode Island Red	Tuberculosis.
April 6	700	23	White Wyandotte	Peritonitis resulting from inflammation of the oviduct.
" 11	217	39	White Wyandotte	Rupture of a fatty liver.
" 16	536	93	White Leghorn	Peritonitis following rupture of the oviduct.
" 22	588	101	Buff Rock	Enteritis and peritonitis.
" 30	585	101	Buff Rock	Sarcoma of the kidneys and nerves.
" 30	673	116	Buff Rock	Tuberculosis.
May 2	221	39	White Wyandotte	Peritonitis which resulted from inflammation of the oviduct.
" 2	611	105	Barred Rock	Peritonitis which resulted from inflammation of the oviduct.
" 4	386	71	Rhode Island Red	Tuberculosis.
" 4	237	45	Rhode Island Red	Rupture of liver.
" 5	546	94	White Leghorn	Peritonitis.
" 9	495	64	Rhode Island Red	Peritonitis which resulted from inflammation of the oviduct.
" 20	481	62	Rhode Island Red	Peritonitis.
" 20	387	71	Rhode Island Red	Tuberculosis.
" 27	24	4	White Wyandotte	Peritonitis.
June 2	633	109	Buff Rock	Tuberculosis.
" 8	503	86	Rhode Island Red	Tuberculosis.
" 12	525	91	White Leghorn	Peritonitis and oviductitis.
" 12	551	95	White Leghorn	Chronic cirrhosis of the liver and chronic peritonitis.
" 13	410	75	Rhode Island Red	Peritonitis.
" 15	488	63	Rhode Island Red	Peritonitis.
" 25	305	54	Rhode Island Red	Tuberculosis and gout.
" 25	87	15	White Wyandotte	Tumours of the liver.
" 27	653	112	Barred Rock	Tuberculosis.
" 29	384	70	Rhode Island Red	Peritonitis.
" 29	539	93	White Leghorn	Leukaemia.
July 2	703	25	White Wyandotte	Leukaemia.
" 3	466	84	Rhode Island Red	Peritonitis which resulted from inflammation of the oviduct.
" 10	391	72	Rhode Island Red	Tuberculosis, also affected with peritonitis.

Date of Death	Number of Pullet	Number of Pen	Breed	Cause of Death
1936				
July 11	380	70	Rhode Island Red	Tuberculosis.
" 11	500	86	Rhode Island Red	General atrophy of the internal organs.
" 16	509	88	White Leghorn	Peritonitis.
" 20	549	95	White Leghorn	Internal haemorrhage which resulted from tumours.
" 23	586	101	Buff Rock	Peritonitis.
" 24	271	49	Rhode Island Red	Tuberculosis.
" 29	320	57	Rhode Island Red	Haemorrhage from blood tumours in the liver.
Aug. 1	157	29	White Wyandotte	Peritonitis.
" 4	680	117	Light Sussex	Pneumonia.
" 11	456	82	Rhode Island Red	Gout.
" 12	218	39	White Wyandotte	Rupture of the liver.
" 12	334	59	Rhode Island Red	Oviductitis.
" 15	236	45	Rhode Island Red	Peritonitis.
" 27	707	25	White Wyandotte	Acute fatty infiltration of the liver.
" 31	499	86	Rhode Island Red	Toxaemia.
" 31	637	110	Buff Rock	Peritonitis.
Sept. 1	689	118	Barred Rock	Leukaemia.

TABLE XVII.

Number and Percentage of Deaths for each Breed.

Breed	Number of Pullets Penned	Number of Deaths	Percentage of Deaths
White Wyandotte	264	11	% 4.2
Rhode Island Red	258	25	9.7
White Leghorn	72	9	12.5
Barred Rock	42	4	9.5
Buff Rock	36	7	19.4
Light Sussex	30	2	6.7
All Breeds	702	58	8.3

SECTION I.—WHITE WYANDOTTE.—24 PENS.,

[illegible]

* Disqualified under Clause 28 (more than 20 per cent, second grade eggs).

Order of Merit	NAME AND ADDRESS OF OWNER	Date of Hatching	No. of Pullet	WEIGHT		EGGS LAID												EGGS PER PULPET				Average Weight of Eggs per Pullet				(a) Total Eggs from Pen.				Number of times Broody	Date of Moulting (Neck moult in italics)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
				On arrival	At close of year	Oct. 4-Oct. 31	Nov. 1-Nov. 28	Nov. 29-Dec. 26	Dec. 27-Jan. 23	Jan. 24-Feb. 20	Feb. 21-Mar. 19	Mar. 20-Apr. 16	Apr. 17-May 14	May 15-June 11	June 12-July 9	July 10-Aug. 6	Aug. 7-Sep. 3	Special Grade	First Grade	Second Grade	Total	First Grade	Oct. 4-Jan. 3	Value per Pullet																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
																								d. oz.	lb.	oz.	lb.	oz.	lb.			oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.

D. = Dead. * Disqualified under Clause 23 (more than 20 per cent. second grade eggs).

[illegible]

SECTION 11.--WHITE WYANDOTTE (STATION HOLDERS)---(continued).

Order of Merit	NAME AND ADDRESS OF OWNER	Date of Hatching	WEIGHT		EGGS LAID												EGGS PER PULLETT				Average Weight of Eggs per Pullet	Value per Pullet	Eggs under Prescribed				Number of times Broody	Date of Moulting (neck joints in males)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
			No. of Pullets	At close of Week	Oct. 4	Oct. 11	Oct. 18	Oct. 25	Nov. 1	Nov. 8	Nov. 15	Nov. 22	Dec. 6	Dec. 13	Dec. 20	Jan. 3	Jan. 10	Jan. 17	Jan. 24	Feb. 7			Feb. 14	Feb. 21	Mar. 7	Mar. 14			Mar. 21	Apr. 4	Apr. 11	Apr. 18	Apr. 25	May 2	May 9	May 16	May 23	June 6	June 13	June 20	June 27	July 4	July 11	July 18	July 25	Aug. 1	Aug. 8	Aug. 15	Aug. 22	Aug. 29	Sept. 5	Sept. 12	Sept. 19	Sept. 26	Oct. 3	Oct. 10	Oct. 17	Oct. 24	Oct. 31	Nov. 7	Nov. 14	Nov. 21	Nov. 28	Dec. 5	Dec. 12	Dec. 19	Dec. 26	Jan. 2	Jan. 9	Jan. 16	Jan. 23	Jan. 30	Feb. 6	Feb. 13	Feb. 20	Feb. 27	Mar. 6	Mar. 13	Mar. 20	Mar. 27	Apr. 3	Apr. 10	Apr. 17	Apr. 24	Apr. 30	May 7	May 14	May 21	May 28	June 4	June 11	June 18	June 25	July 2	July 9	July 16	July 23	July 30	Aug. 6	Aug. 13	Aug. 20	Aug. 27	Sept. 3	Sept. 10	Sept. 17	Sept. 24	Sept. 30	Oct. 7	Oct. 14	Oct. 21	Oct. 28	Nov. 4	Nov. 11	Nov. 18	Nov. 25	Dec. 2	Dec. 9	Dec. 16	Dec. 23	Dec. 30	Jan. 6	Jan. 13	Jan. 20	Jan. 27	Feb. 3	Feb. 10	Feb. 17	Feb. 24	Feb. 29	Mar. 6	Mar. 13	Mar. 20	Mar. 27	Apr. 3	Apr. 10	Apr. 17	Apr. 24	Apr. 30	May 7	May 14	May 21	May 28	June 4	June 11	June 18	June 25	July 2	July 9	July 16	July 23	July 30	Aug. 6	Aug. 13	Aug. 20	Aug. 27	Sept. 3	Sept. 10	Sept. 17	Sept. 24	Sept. 30	Oct. 7	Oct. 14	Oct. 21	Oct. 28	Nov. 4	Nov. 11	Nov. 18	Nov. 25	Dec. 2	Dec. 9	Dec. 16	Dec. 23	Dec. 30	Jan. 6	Jan. 13	Jan. 20	Jan. 27	Feb. 3	Feb. 10	Feb. 17	Feb. 24	Feb. 29	Mar. 6	Mar. 13	Mar. 20	Mar. 27	Apr. 3	Apr. 10	Apr. 17	Apr. 24	Apr. 30	May 7	May 14	May 21	May 28	June 4	June 11	June 18	June 25	July 2	July 9	July 16	July 23	July 30	Aug. 6	Aug. 13	Aug. 20	Aug. 27	Sept. 3	Sept. 10	Sept. 17	Sept. 24	Sept. 30	Oct. 7	Oct. 14	Oct. 21	Oct. 28	Nov. 4	Nov. 11	Nov. 18	Nov. 25	Dec. 2	Dec. 9	Dec. 16	Dec. 23	Dec. 30	Jan. 6	Jan. 13	Jan. 20	Jan. 27	Feb. 3	Feb. 10	Feb. 17	Feb. 24	Feb. 29	Mar. 6	Mar. 13	Mar. 20	Mar. 27	Apr. 3	Apr. 10	Apr. 17	Apr. 24	Apr. 30	May 7	May 14	May 21	May 28	June 4	June 11	June 18	June 25	July 2	July 9	July 16	July 23	July 30	Aug. 6	Aug. 13	Aug. 20	Aug. 27	Sept. 3	Sept. 10	Sept. 17	Sept. 24	Sept. 30	Oct. 7	Oct. 14	Oct. 21	Oct. 28	Nov. 4	Nov. 11	Nov. 18	Nov. 25	Dec. 2	Dec. 9	Dec. 16	Dec. 23	Dec. 30	Jan. 6	Jan. 13	Jan. 20	Jan. 27	Feb. 3	Feb. 10	Feb. 17	Feb. 24	Feb. 29	Mar. 6	Mar. 13	Mar. 20	Mar. 27	Apr. 3	Apr. 10	Apr. 17	Apr. 24	Apr. 30	May 7	May 14	May 21	May 28	June 4	June 11	June 18	June 25	July 2	July 9	July 16	July 23	July 30	Aug. 6	Aug. 13	Aug. 20	Aug. 27	Sept. 3	Sept. 10	Sept. 17	Sept. 24	Sept. 30	Oct. 7	Oct. 14	Oct. 21	Oct. 28	Nov. 4	Nov. 11	Nov. 18	Nov. 25	Dec. 2	Dec. 9	Dec. 16	Dec. 23	Dec. 30	Jan. 6	Jan. 13	Jan. 20	Jan. 27	Feb. 3	Feb. 10	Feb. 17	Feb. 24	Feb. 29	Mar. 6	Mar. 13	Mar. 20	Mar. 27	Apr. 3	Apr. 10	Apr. 17	Apr. 24	Apr. 30	May 7	May 14	May 21	May 28	June 4	June 11	June 18	June 25	July 2	July 9	July 16	July 23	July 30	Aug. 6	Aug. 13	Aug. 20	Aug. 27	Sept. 3	Sept. 10	Sept. 17	Sept. 24	Sept. 30	Oct. 7	Oct. 14	Oct. 21	Oct. 28	Nov. 4	Nov. 11	Nov. 18	Nov. 25	Dec. 2	Dec. 9	Dec. 16	Dec. 23	Dec. 30	Jan. 6	Jan. 13	Jan. 20	Jan. 27	Feb. 3	Feb. 10	Feb. 17	Feb. 24	Feb. 29	Mar. 6	Mar. 13	Mar. 20	Mar. 27	Apr. 3	Apr. 10	Apr. 17	Apr. 24	Apr. 30	May 7	May 14	May 21	May 28	June 4	June 11	June 18	June 25	July 2	July 9	July 16	July 23	July 30	Aug. 6	Aug. 13	Aug. 20	Aug. 27	Sept. 3	Sept. 10	Sept. 17	Sept. 24	Sept. 30	Oct. 7	Oct. 14	Oct. 21	Oct. 28	Nov. 4	Nov. 11	Nov. 18	Nov. 25	Dec. 2	Dec. 9	Dec. 16	Dec. 23	Dec. 30	Jan. 6	Jan. 13	Jan. 20	Jan. 27	Feb. 3	Feb. 10	Feb. 17	Feb. 24	Feb. 29	Mar. 6	Mar. 13	Mar. 20	Mar. 27	Apr. 3	Apr. 10	Apr. 17	Apr. 24	Apr. 30	May 7	May 14	May 21	May 28	June 4	June 11	June 18	June 25	July 2	July 9	July 16	July 23	July 30	Aug. 6	Aug. 13	Aug. 20	Aug. 27	Sept. 3	Sept. 10	Sept. 17	Sept. 24	Sept. 30	Oct. 7	Oct. 14	Oct. 21	Oct. 28	Nov. 4	Nov. 11	Nov. 18	Nov. 25	Dec. 2	Dec. 9	Dec. 16	Dec. 23	Dec. 30	Jan. 6	Jan. 13	Jan. 20	Jan. 27	Feb. 3	Feb. 10	Feb. 17	Feb. 24	Feb. 29	Mar. 6	Mar. 13	Mar. 20	Mar. 27	Apr. 3	Apr. 10	Apr. 17	Apr. 24	Apr. 30	May 7	May 14	May 21	May 28	June 4	June 11	June 18	June 25	July 2	July 9	July 16	July 23	July 30	Aug. 6	Aug. 13	Aug. 20	Aug. 27	Sept. 3	Sept. 10	Sept. 17	Sept. 24	Sept. 30	Oct. 7	Oct. 14	Oct. 21	Oct. 28	Nov. 4	Nov. 11	Nov. 18	Nov. 25	Dec. 2	Dec. 9	Dec. 16	Dec. 23	Dec. 30	Jan. 6	Jan. 13	Jan. 20	Jan. 27	Feb. 3	Feb. 10	Feb. 17	Feb. 24	Feb. 29	Mar. 6	Mar. 13	Mar. 20	Mar. 27	Apr. 3	Apr. 10	Apr. 17	Apr. 24	Apr. 30	May 7	May 14	May 21	May 28	June 4	June 11	June 18	June 25	July 2	July 9	July 16	July 23	July 30	Aug. 6	Aug. 13	Aug. 20	Aug. 27	Sept. 3	Sept. 10	Sept. 17	Sept. 24	Sept. 30	Oct. 7	Oct. 14	Oct. 21	Oct. 28	Nov. 4	Nov. 11	Nov. 18	Nov. 25	Dec. 2	Dec. 9	Dec. 16	Dec. 23	Dec. 30	Jan. 6	Jan. 13	Jan. 20	Jan. 27	Feb. 3	Feb. 10	Feb. 17	Feb. 24	Feb. 29	Mar. 6	Mar. 13	Mar. 20	Mar. 27	Apr. 3	Apr. 10	Apr. 17	Apr. 24	Apr. 30	May 7	May 14	May 21	May 28	June 4	June 11	June 18	June 25	July 2	July 9	July 16	July 23	July 30	Aug. 6	Aug. 13	Aug. 20	Aug. 27	Sept. 3	Sept. 10	Sept. 17	Sept. 24	Sept. 30	Oct. 7	Oct. 14	Oct. 21	Oct. 28	Nov. 4	Nov. 11	Nov. 18	Nov. 25	Dec. 2	Dec. 9	Dec. 16	Dec. 23	Dec. 30	Jan. 6	Jan. 13	Jan. 20	Jan. 27	Feb. 3	Feb. 10	Feb. 17	Feb. 24	Feb. 29	Mar. 6	Mar. 13	Mar. 20	Mar. 27	Apr. 3	Apr. 10	Apr. 17	Apr. 24	Apr. 30	May 7	May 14	May 21	May 28	June 4	June 11	June 18	June 25	July 2	July 9	July 16	July 23	July 30	Aug. 6	Aug. 13	Aug. 20	Aug. 27	Sept. 3	Sept. 10	Sept. 17	Sept. 24	Sept. 30	Oct. 7	Oct. 14	Oct. 21	Oct. 28	Nov. 4	Nov. 11	Nov. 18	Nov. 25	Dec. 2	Dec. 9	Dec. 16	Dec. 23	Dec. 30	Jan. 6	Jan. 13	Jan. 20	Jan. 27	Feb. 3	Feb. 10	Feb. 17	Feb. 24	Feb. 29	Mar. 6	Mar. 13	Mar. 20	Mar. 27	Apr. 3	Apr. 10	Apr. 17	Apr. 24	Apr. 30	May 7	May 14	May 21	May 28	June 4	June 11	June 18	June 25	July 2	July 9	July 16	July 23	July 30	Aug. 6	Aug. 13	Aug. 20	Aug. 27	Sept. 3	Sept. 10	Sept. 17	Sept. 24	Sept. 30	Oct. 7	Oct. 14	Oct. 21	Oct. 28	Nov. 4	Nov. 11	Nov. 18	Nov. 25	Dec. 2	Dec. 9	Dec. 16	Dec. 23	Dec. 30	Jan. 6	Jan. 13	Jan. 20	Jan. 27	Feb. 3	Feb. 10	Feb. 17	Feb. 24	Feb. 29	Mar. 6	Mar. 13	Mar. 20	Mar. 27	Apr. 3	Apr. 10	Apr. 17	Apr. 24	Apr. 30	May 7	May 14	May 21	May 28	June 4	June 11	June 18	June 25	July 2	July 9	July 16	July 23	July 30	Aug. 6	Aug. 13	Aug. 20	Aug. 27	Sept. 3	Sept. 10	Sept. 17	Sept. 24	Sept. 30	Oct. 7	Oct. 14	Oct. 21	Oct. 28	Nov. 4	Nov. 11	Nov. 18	Nov. 25	Dec. 2	Dec. 9	Dec. 16	Dec. 23	Dec. 30	Jan. 6	Jan. 13	Jan. 20	Jan. 27	Feb. 3	Feb. 10	Feb. 17	Feb. 24	Feb. 29	Mar. 6	Mar. 13	Mar. 20	Mar. 27	Apr. 3	Apr. 10	Apr. 17	Apr. 24	Apr. 30	May 7	May 14	May 21	May 28	June 4	June 11	June 18	June 25	July 2	July 9	July 16	July 23	July 30	Aug. 6	Aug. 13	Aug. 20	Aug. 27	Sept. 3	Sept. 10	Sept. 17	Sept. 24	Sept. 30	Oct. 7	Oct. 14	Oct. 21	Oct. 28	Nov. 4	Nov. 11	Nov. 18	Nov. 25	Dec. 2	Dec. 9	Dec. 16	Dec. 23	Dec. 30	Jan. 6	Jan. 13	Jan. 20	Jan. 27	Feb. 3	Feb. 10	Feb. 17	Feb. 24	Feb. 29	Mar. 6	Mar. 13	Mar. 20	Mar. 27	Apr. 3	Apr. 10	Apr. 17	Apr. 24	Apr. 30	May 7	May 14	May 21	May 28	June 4	June 11	June 18	June 25	July 2	July 9	July 16	July 23	July 30	Aug. 6	Aug. 13	Aug. 20	Aug. 27	Sept. 3	Sept. 10	Sept. 17	Sept. 24	Sept. 30	Oct. 7	Oct. 14	Oct. 21	Oct. 28	Nov. 4	Nov. 11	Nov. 18	Nov. 25	Dec. 2	Dec. 9	Dec. 16	Dec. 23	Dec. 30	Jan. 6	Jan. 13	Jan. 20	Jan. 27	Feb. 3	Feb. 10	Feb. 17	Feb. 24	Feb. 29	Mar. 6	Mar. 13	Mar. 20	Mar. 27	Apr. 3	Apr. 10	Apr. 17	Apr. 24	Apr. 30	May 7	May 14	May 21	May 28	June 4	June 11	June 18	June 25	July 2	July 9	July 16	July 23	July 30	Aug. 6	Aug. 13	Aug. 20	Aug. 27	Sept. 3	Sept. 10	Sept. 17	Sept. 24	Sept. 30	Oct. 7	Oct. 14	Oct. 21	Oct. 28	Nov. 4	Nov. 11	Nov. 18	Nov. 25	Dec. 2	Dec. 9	Dec. 16	Dec. 23	Dec. 30	Jan. 6	Jan. 13	Jan. 20	Jan. 27	Feb. 3	Feb. 10	Feb. 17	Feb. 24	Feb. 29	Mar. 6	Mar. 13	Mar. 20	Mar. 27	Apr. 3	Apr. 10	Apr. 17	Apr. 24

SECTION II.—WHITE WYANDOTTE (STATION HOLDERS)—(continued)

Order of Merit	NAME AND ADDRESS OF OWNER	Date of Hatching	WEIGHT		EGGS LAID										EGGS SET FORTHE				Average Weight of Eggs per Pullet		(a) Total Eggs from Pen.				Bugs under Prescribed	Number of times Broody	Date of Moulting (Neck moult in Italics)																																																																																																																																																																		
			No. of Pullet	On Ar-rival	At close of Test	Oct. 4-Oct. 31	Nov. 1-Nov. 30	Nov. 29-Dec. 28	Dec. 27-Jan. 23	Jan. 24-Feb. 20	Feb. 21-Mar. 19	Mar. 20-Apr. 16	Apr. 17-May 14	May 15-June 11	June 12-July 9	July 10-Aug. 6	Aug. 7-Sep. 3	Special Grade	First Grade	Second Grade	Total	First Grade	Oct. 4-Jan. 3	lb. oz.				dr.	(a) 1,100	(b) 108 2 12	(c) 26.9	(d) 58 8 9 1/2																																																																																																																																																													
11	43	Miss A. Hanly, Cappra House, Carrigrohilly, Co. Tipperary.	15/2/35 10/3/35 " " 15/2/35	241 242 243 244 245 246	5 5 4 10 4 13 5 11 4 15 4 10	6 0 4 10 4 13 5 9 5 12 4 9	19 22 22 17 24 17 24 17 24 17 6	18 18 17 17 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 16 16 16 16 16 16 16 16 4	18 18 1

* Disqualified under Clause 28 (more than 20 per cent. second grade eggs).

U.T.—Untrapped.

SECTION II. — WHITE WYANDOTTE (STATION HOLDERS) — (continued).

Order of Merit	NAME AND ADDRESS OF OWNER	Date of Hatching	No. of Pullets	WEIGHT		EGGS LAID												EGGS PER PULLET				Value per Pullet	Average Weight of Eggs per Pullet	(a) Total Eggs from Pen. (b) Total weight per dozen. (c) Total value from Pen.				Eggs under Prescribed Weight	Number of times Broody	Date of Moulting (Neck moult in italics)			
				On arrival of first lb. oz.	At close of first lb. oz.	Oct. 4-Oct. 31	Nov. 1-Nov. 28	Nov. 29-Dec 26	Dec. 27-Jan. 23	Jan. 24-Feb. 20	Feb. 21-Mar. 19	Mar. 20-Apr. 16	Apr. 17-May 14	May 15-June 11	June 12-July 9	July 10-Aug. 6	Aug. 7-Sep. 3	Special Grade	First Grade	Second Grade	Total			First Grade	Oct. 4-Jan. 3	d. oz. dr.	lb. oz. dr.				(a) 1,076 (b) 142 14 3 (c) 25.5 (d) 26 1 7½	(a) 1,081 (b) 152 10 15 (c) 25.4 (d) 25 13 4½	(a) 1,007 (b) 128 8 8 (c) 24.5 (d) 25 9 5½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½
14	Mrs. A. Glinney, Castledillonagh, Co. Louth.	4/3/35	181	4 8	5 0	19	20	13	16	18	20	22	19	18	17	19	16	2	136	79	217	11	22 64	2 0	(a) 1,076 (b) 142 14 3 (c) 25.5 (d) 26 1 7½	(a) 1,081 (b) 152 10 15 (c) 25.4 (d) 25 13 4½	(a) 1,007 (b) 128 8 8 (c) 24.5 (d) 25 9 5½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½	—	1	June Oct., June	
		"	182	6 7	6 3	21	21	19	17	20	20	21	24	22	20	13	22	2	239	50	298	47	26 64	1 15	(a) 1,076 (b) 142 14 3 (c) 25.5 (d) 26 1 7½	(a) 1,081 (b) 152 10 15 (c) 25.4 (d) 25 13 4½	(a) 1,007 (b) 128 8 8 (c) 24.5 (d) 25 9 5½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½	1	1	July	
		"	183	4 9	4 15	19	21	19	17	20	20	21	24	22	20	13	22	33	24	—	57	44	7 94	2 2	(a) 1,076 (b) 142 14 3 (c) 25.5 (d) 26 1 7½	(a) 1,081 (b) 152 10 15 (c) 25.4 (d) 25 13 4½	(a) 1,007 (b) 128 8 8 (c) 24.5 (d) 25 9 5½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½	—	—	Oct., Feb., July	
		"	184	4 8	5 8	17	20	19	13	19	20	22	20	22	20	18	15	212	8	220	56	24	9	2 7	(a) 1,076 (b) 142 14 3 (c) 25.5 (d) 26 1 7½	(a) 1,081 (b) 152 10 15 (c) 25.4 (d) 25 13 4½	(a) 1,007 (b) 128 8 8 (c) 24.5 (d) 25 9 5½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½	—	—	Oct., Aug.	
		"	185	4 8	5 8	17	20	19	13	19	20	22	20	22	20	18	15	212	8	220	56	24	9	2 7	(a) 1,076 (b) 142 14 3 (c) 25.5 (d) 26 1 7½	(a) 1,081 (b) 152 10 15 (c) 25.4 (d) 25 13 4½	(a) 1,007 (b) 128 8 8 (c) 24.5 (d) 25 9 5½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½	—	—	Oct., Aug.	
		"	186	4 12	6 2	22	25	25	25	25	25	25	25	25	25	25	25	89	100	4	263	75	20 74	2 2	(a) 1,076 (b) 142 14 3 (c) 25.5 (d) 26 1 7½	(a) 1,081 (b) 152 10 15 (c) 25.4 (d) 25 13 4½	(a) 1,007 (b) 128 8 8 (c) 24.5 (d) 25 9 5½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½	—	—	Oct., Aug.	
15	Mrs M. M. Howe, Grangevalle, Errill, Ballybrophy, Laoghaigh.	20/2/35	205	5 2	5 1	—	—	10	17	20	18	21	22	16	17	19	15	111	63	1	175	15	18 24	2 4	(a) 1,081 (b) 152 10 15 (c) 25.4 (d) 25 13 4½	(a) 1,081 (b) 152 10 15 (c) 25.4 (d) 25 13 4½	(a) 1,007 (b) 128 8 8 (c) 24.5 (d) 25 9 5½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½	—	—	Oct., July Oct., Aug.	
		20/2/35	206	5 2	5 10	—	—	14	19	20	18	21	22	16	17	19	15	111	63	1	175	15	18 24	2 4	(a) 1,081 (b) 152 10 15 (c) 25.4 (d) 25 13 4½	(a) 1,081 (b) 152 10 15 (c) 25.4 (d) 25 13 4½	(a) 1,007 (b) 128 8 8 (c) 24.5 (d) 25 9 5½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½	—	—	Oct., July	
		20/2/35	207	5 12	6 5	22	21	19	16	19	21	22	14	14	15	13	19	182	2	152	66	21 33	2 5	(a) 1,081 (b) 152 10 15 (c) 25.4 (d) 25 13 4½	(a) 1,081 (b) 152 10 15 (c) 25.4 (d) 25 13 4½	(a) 1,007 (b) 128 8 8 (c) 24.5 (d) 25 9 5½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½	4	4	Oct., July		
		8/3/35	208	5 6	6 13	22	21	19	16	19	21	22	14	14	15	13	19	182	2	152	66	21 33	2 5	(a) 1,081 (b) 152 10 15 (c) 25.4 (d) 25 13 4½	(a) 1,081 (b) 152 10 15 (c) 25.4 (d) 25 13 4½	(a) 1,007 (b) 128 8 8 (c) 24.5 (d) 25 9 5½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½	5	5	Oct., July		
		20/2/35	210	5 1	5 6	25	21	22	14	15	21	23	17	17	15	4	—	101	3	1	194	72	22 94	2 0	(a) 1,081 (b) 152 10 15 (c) 25.4 (d) 25 13 4½	(a) 1,081 (b) 152 10 15 (c) 25.4 (d) 25 13 4½	(a) 1,007 (b) 128 8 8 (c) 24.5 (d) 25 9 5½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½	—	—	July, June	
		U.T.																															
16	Mrs. M. Connolly, Carrigmore, Droghda, Co. Monaghan.	Feb. '35	157	5 0	D	23	22	19	22	19	16	22	23	24	23	50	—	50	153	6	218	65	24 114	2 2	(a) 1,007 (b) 128 8 8 (c) 24.5 (d) 25 9 5½	(a) 1,007 (b) 128 8 8 (c) 24.5 (d) 25 9 5½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½	2	2	Oct., July	
		"	158	4 11	D	23	18	10	9	12	17	23	20	26	22	19	15	10	167	47	214	44	22 51	2 0	(a) 1,007 (b) 128 8 8 (c) 24.5 (d) 25 9 5½	(a) 1,007 (b) 128 8 8 (c) 24.5 (d) 25 9 5½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½	—	—	Oct.	
		"	159	4 11	5	27	17	D	17	D	17	23	20	26	22	19	15	10	167	47	214	44	22 51	2 0	(a) 1,007 (b) 128 8 8 (c) 24.5 (d) 25 9 5½	(a) 1,007 (b) 128 8 8 (c) 24.5 (d) 25 9 5½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½	2	2	Oct.	
		"	160	4 10	5 1	21	19	19	18	16	22	22	7	7	12	11	1	41	90	1	5	207	59	24 24	2 0	(a) 1,007 (b) 128 8 8 (c) 24.5 (d) 25 9 5½	(a) 1,007 (b) 128 8 8 (c) 24.5 (d) 25 9 5½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½	2	2	July, June
		March, '35	161	4 10	5 6	24	21	19	18	16	22	22	7	7	12	11	1	9	90	20	119	13	12 51	2 0	(a) 1,007 (b) 128 8 8 (c) 24.5 (d) 25 9 5½	(a) 1,007 (b) 128 8 8 (c) 24.5 (d) 25 9 5½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½	1	1	Oct., Aug.	
		"	162	5 2	5 11	21	21	10	6	21	24	26	22	20	22	19	20	4	151	77	232	26	23 61	2 0	(a) 1,007 (b) 128 8 8 (c) 24.5 (d) 25 9 5½	(a) 1,007 (b) 128 8 8 (c) 24.5 (d) 25 9 5½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½	—	—	Oct., June	
17	Mrs. J. Foley, Moyhill House, Carrigmore, Co. Clare.	14/3/35	708	4 8	D	—	—	—	—	—	—	—	—	—	—	—	—	—	63	5	65	—	5 81	2 1	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½	1	2	Oct.	
		"	704	4 11	5 0	—	—	—	—	—	—	—	—	—	—	—	—	—	15	5	175	51	20 81	2 2	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½	4	4	Oct., July	
		"	705	4 11	4 15	11	—	—	17	23	25	16	14	13	10	17	2	13	106	20	139	57	27 24	2 13	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½	—	—	Oct., July	
		"	706	4 10	5 6	4	24	23	20	22	23	23	24	23	23	8	23	15	232	2	239	57	27 24	2 13	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½	2	2	Oct., May	
		"	707	4 10	D	20	24	23	19	23	23	23	24	23	23	12	14	64	153	15	238	52	26 44	2 2	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½	1	1	Dec., May	
		"	708	4 8	5 12	5	24	23	19	23	23	23	24	23	23	12	14	64	154	8	238	52	26 44	2 2	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 990 (b) 128 1 4 (c) 24.8 (d) 25 8 1½	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½	—	—	Oct., June	
18	Miss M. Crenin, Granavong, Newmarket, Co. Cork.	20/1/35	247	6 8	6 13	—	—	—	—	—	—	—	—	—	—	—	—	—	100	49	—	149	—	13 101	2 4	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½	—	—	Oct., June
		19/2/35	248	4 8	4 10	—	—	—	—	—	—	—	—	—	—	—	—	—	65	77	1	143	1	14 34	2 3	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½	1	1	Oct., July
		"	249	5 7	6 7	11	12	3	1	—	—	—	—	—	—	—	—	7	19	1	27	26	4 04	2 0	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½	(a) 881 (b) 113 2 10 (c) 26.1 (d) 24 8 10½	(a) 881 (b) 113 2					

SECTION III.—RHODE ISLAND RED.—21 PENS.

Order of Merit	NAME AND ADDRESS OF OWNER	Date of Hatching	WEIGHT			EGGS LAID												EGGS PER PULLETT				Value per Pullet	Average Weight of Eggs per Pullet	(a) Total Eggs from Pen.	(b) Total weight per dozen.	(c) Av. weight from Pen.	Number of times Brooded	Date of Moulting (Neck moults in italics)
			No. of Pullets			EGGS LAID												EGGS PER PULLETT										
			On arrival.	At close of trial.	At close of trial.	Oct. 4-Oct. 31	Nov. 1-Nov. 28	Nov. 29-Dec. 26	Dec. 27-Jan. 23	Jan. 24-Feb. 20	Feb. 21-Mar. 19	Mar. 20-Apr. 16	Apr. 17-May 14	May 15-June 11	June 12-July 9	July 10-Aug. 6	Aug. 7-Sep. 3	Special Grade	First Grade	Second Grade	Total								Oct. 4-Jan. 3
1	Mrs. D. A. Strong, Beaumont House, Ossauanus Mór, Co. Meath.	8/3/35 18/3/35 10/2/35 21/2/35 15/2/35	283 264 267 267 256	4 10 4 11 4 8 5 3 5 5	4 12 5 12 4 12 5 12 5 12	20 24 23 20 24	18 19 21 22 19	21 22 23 24 23	19 24 25 26 22	19 24 25 26 22	19 24 25 26 22	18 19 20 21 22	18 19 20 21 22	18 19 20 21 22	18 19 20 21 22	157 149 206 110 169	78 149 231 231 218	— 40 231 231 218	— 40 231 231 218	78 149 231 231 218	— 40 231 231 218	(a) 1,815 dr. (b) 187 2 5 oz. (c) 27.3 oz. (d) 27 10 11½						
2	Mrs. D. C. Chearnley, Safford House, The Wexford.	Feb. '35	265 265 268 268 270	4 12 5 11 5 11 5 11 5 11	4 12 5 11 5 11 5 11 5 11	— — — — —	— — — — —	— — — — —	— — — — —	— — — — —	— — — — —	— — — — —	— — — — —	— — — — —	— — — — —	— — — — —	— — — — —	— — — — —	— — — — —	— — — — —	— — — — —	(a) 1,860 lb. oz. dr. (b) 179 2 8 oz. (c) 25.3 oz. (d) 27 7 3½						
3	Mrs. M. McEl Lough, Bedford, Listowel, Co. Kerry.	15/2/35 " " 2/3/35 22/2/35 22/2/35	691 692 693 694 695 696	5 2 5 4 5 4 5 5 5 5	5 3 5 4 5 4 5 5 5 5	5 3 5 4 5 4 5 5 5 5	22 23 21 21 23	21 21 21 21 21	25 25 24 24 23	25 25 24 24 23	25 25 24 24 23	21 21 21 21 21	17 17 17 17 17	15 15 15 15 15	15 15 15 15 15	82 152 162 175 167	147 136 152 175 167	13 136 152 175 167	— — — — —	— — — — —	— — — — —	— — — — —	(a) 1,256 lb. oz. dr. (b) 175 6 5 oz. (c) 20.8 oz. (d) 27 3 1½					
4	Mrs. F. H. Kent, Cherry Hill, Borrisokane, Co. Tipperary.	21/1/35 10/2/35 21/1/35 1/1/35	995 996 997 998 999	5 2 5 4 5 4 5 4 5 4	5 2 5 4 5 4 5 4 5 4	5 2 5 4 5 4 5 4 5 4	21 21 21 21 21	19 19 19 19 19	20 20 20 20 20	20 20 20 20 20	20 20 20 20 20	19 19 19 19 19	17 17 17 17 17	15 15 15 15 15	15 15 15 15 15	102 102 102 102 102	102 102 102 102 102	6 6 6 6 6	— — — — —	— — — — —	— — — — —	— — — — —	(a) 1,226 lb. oz. dr. (b) 163 5 5 oz. (c) 25.6 oz. (d) 26 18 5½					
5	Mrs. M. A. Miller, Millview, Rathowen, Co. Longford.	March '86 " " " " " "	295 296 297 298 299 300	4 12 4 12 4 12 4 12 4 10	4 12 4 12 4 12 4 12 4 10	4 12 4 12 4 12 4 12 4 10	21 21 21 21 21	18 18 18 18 18	19 19 19 19 19	20 20 20 20 20	20 20 20 20 20	14 14 14 14 14	6 6 6 6 6	— — — — —	— — — — —	— — — — —	— — — — —	— — — — —	— — — — —	— — — — —	— — — — —	(a) 1,124 lb. oz. dr. (b) 151 12 5 oz. (c) 25.9 oz. (d) 26 7 4½						

SECTION III.—RHODE ISLAND RED—(continued).

Order of Mating	NAME AND ADDRESS OF OWNER	Date of Hatching	WEIGHT		EGGS LAID												EGGS PER POULTER				Average Weight of Eggs per Pullet	Total Eggs from Pen.	Total weight per dozen.	Date of Moulting (Neck moults in Italics)			
			No. of Pullet	On Arrival of Test	Oct. 4-Oct. 31	Nov. 1-Nov. 28	Nov. 29-Dec. 26	Dec. 27-Jan. 23	Jan. 24-Feb. 20	Feb. 21-Mar. 19	Mar. 20-Apr. 10	Apr. 11-May 14	May 15-June 11	June 12-July 9	July 10-Aug. 6	Aug. 7-Sep. 3	Special Grade	First Grade	Second Grade	Total					First Grade 3	Oct. & Jan. 3	
49	Mrs. E. M. O'Flynn, Prohurst, Milford, Charleyville, Co. Conn.	15/2/85	271	5 3	D	16	27	22	17	18	24	9	20	10	14	6	59	95	1	135	72	1	144	3	Oct., May		
"	"	"	272	4 15	5 12	24	22	22	17	18	24	9	20	10	14	6	59	95	1	135	72	1	144	3	Oct., May		
"	"	"	273	4 13	5 10	24	23	20	18	19	22	19	17	7	7	17	11	75	128	214	42	dr.	2	Oct., Jan.,			
"	"	"	274	4 8	5 8	24	21	21	18	23	26	24	22	13	10	58	128	12	196	46	1	152	1	Oct., Jan.,			
"	"	"	275	5 6	5 13	14	17	23	4	25	26	24	8	13	14	11	77	72	170	246	3	24	1	July			
"	"	"	276	4 10	4 8	22	26	24	21	23	26	24	25	13	12	7	4	72	170	246	3	24	1	Dec., June			
50	Capt. H. M. S. Richmond, Popplefield, Athy, Leathis.	12/3/85	277	4 11	5 4	26	21	20	2	0	26	24	15	17	9	9	126	50	2	178	67	20	21	2	Jan., July,		
"	"	21/2/85	278	5 1	5 4	22	25	22	19	20	25	16	15	14	11	186	42	—	228	74	26	10	4	4	June		
"	"	12 3 85	280	4 14	5 10	10	16	16	19	16	21	23	20	21	18	14	107	46	—	213	49	23	81	5	Ang., June		
"	"	"	279	4 14	5 13	17	19	20	13	1	6	21	20	13	1	—	88	41	2	131	58	15	9	9	Ang., June		
"	"	"	281	4 11	5 8	20	20	19	18	19	16	18	20	8	15	4	155	80	—	185	65	22	11	2	Feb., July,		
"	"	12/3/85	282	5 5	5 14	6	—	—	—	18	27	24	21	22	12	15	162	1	—	163	6	15	61	2	8	June	
"	"	"	283	4 10	5 2	23	23	18	17	13	20	20	22	21	12	11	5	80	97	182	25	10	111	1	3	Nov., Aug.,	
"	"	"	284	4 12	D	18	20	18	16	16	17	17	17	17	D	38	15	5	205	64	23	5	2	4	Oct., Apl.		
"	"	"	285	4 8	4 10	18	21	23	23	23	24	25	20	16	22	181	78	3	259	68	20	61	2	3	June		
"	"	"	286	4 8	5 8	10	21	13	—	—	21	22	18	16	11	156	13	5	174	39	18	61	2	4	July, June		
"	"	"	287	5 7	6 1	22	—	—	22	27	28	16	19	21	14	13	103	92	—	195	25	20	72	2	3	Oct.	
61	Mrs. K. Earl, Grantstown House, Waterford.	6/2/85	343	5 7	6 1	22	—	—	22	27	28	16	19	21	14	13	103	92	—	195	25	20	72	2	3	Nov., July,	
"	"	9/2/85	344	4 10	5 7	23	21	20	20	23	26	20	23	18	19	13	19	121	90	230	41	25	4	2	0	July	
"	"	1/2/85	345	4 12	5 8	14	16	16	19	16	18	20	21	24	22	20	4	87	18	203	50	23	81	2	3	Nov., Aug.	
"	"	10/1/85	346	5 9	5 8	22	12	—	5	23	24	19	21	—	—	27	174	13	214	50	23	81	2	3	Nov., July		
"	"	1/2/85	345	5 10	5 9	18	12	—	5	23	24	19	21	—	—	27	174	13	214	50	23	81	2	3	Dec., July		
56	Mrs. K. Earl, Grantstown House, Waterford.	10/1/85	283	5 9	5 14	16	—	3	12	—	22	21	27	23	21	16	20	123	2	181	23	18	01	2	2	1	July
"	"	2/2/85	284	5 3	5 12	17	23	20	19	22	26	27	24	20	14	19	179	72	3	251	67	28	41	2	4	2	Nov., July,
"	"	1/2/85	285	4 12	5 11	17	23	20	19	22	26	27	24	20	14	19	179	72	3	251	67	28	41	2	4	2	June
"	"	"	286	5 0	5 6	14	20	14	18	19	20	—	13	16	11	9	84	96	—	113	46	14	81	2	4	1	Nov., July
"	"	10/1/85	287	5 4	5 5	20	10	20	6	11	14	25	13	16	11	9	106	8	—	113	46	14	81	2	4	1	Nov., July
"	"	9/2/85	288	4 9	4 12	26	24	22	19	23	23	23	20	23	22	21	42	107	27	266	68	29	10	1	1	4	Nov., July

* Disqualified under Clause 28 (more than 20 per cent. second grade eggs).

D—Dead.

SECTION III.—RHODE ISLAND RED.—(continued).

Order of Merit	NAME AND ADDRESS OF OWNER	Date of Hatching	No. of Pullet	WEIGHT		EGGS LAID																EGGS PER PULLET				Value per Pullet	Average Weight of Eggs per Pullet	Total Eggs from Pen.				Blegs under Prescribed Weight	Number of times Broody	Date of Moulting (Neck moults in Italics)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
				On arrival of test	At close of test	Oct. 4-Oct. 31	Nov. 1-Nov. 28	Nov. 29-Dec. 26	Dec. 27-Jan. 23	Jan. 24-Feb. 20	Feb. 21-Mar. 19	Mar. 20-Apr. 16	Apr. 17-May 14	May 15-June 11	June 12-July 9	July 10-Aug. 6	Aug. 7-Sep. 3	Special Grade	First Grade	Second Grade	Total	First Grade Oct. 4-Jan. 3	Second Grade	Third Grade	Total			Total weight per dozen	Av. weight per dozen	Total value from Pen.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
10	Mrs. E. Loughrey, Drummuna, Crusheen, Emils, Co. Clare.	28/2/35	331	4 12	5 3	20	19	18	19	20	19	20	19	20	23	20	11	—	—	3	113	73	189	32	19	24	2	0	(a) 1,062	—	—	Jan., Aug., July																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
		6/3/35	332	5 9	6 8	22	19	20	19	20	19	20	19	20	23	19	13	11	18	38	172	17	227	57	25	10 1	2	0	lb. oz. dr.	1	—	Aug., Nov.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
		28/2/35	333	4 9	5 8	16	15	16	16	16	16	16	16	16	22	20	7	5	7	181	121	1	60	21	6	7	1	3	lb. oz. dr.	1	—	July																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
		"	334	5 4	6 2	21	24	20	20	22	22	22	22	22	23	16	17	16	18	187	141	40	199	60	22	7	2	1	3	oz.	—	—	Oct., July																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
		"	335	4 9	5 6	21	24	20	20	22	22	22	22	22	23	16	17	16	18	187	141	40	199	60	22	7	2	1	3	oz.	—	—	July																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
		"	336	5 0	6 11	20	20	17	17	16	13	15	13	11	—	—	—	—	54	81	7	142	53	17	61	2	2	2	(d) 25 19 1	—	—	July, June																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
11	Mrs. S. D. Deane, Foulmills, Co. Wexford.	7/2/35	493	6 0	6 7	23	17	—	—	7	25	21	26	26	26	24	23	21	209	4	—	213	40	21	101	2	8	6	lb. oz. dr.	1	—	Dec.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
		"	494	6 10	7 9	17	21	21	21	22	24	14	17	17	17	24	20	18	166	67	2	285	67	27	24	2	8	8	lb. oz. dr.	1	—	Oct., July																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
		"	495	6 4	D	20	21	21	21	22	24	14	17	17	17	24	20	18	166	67	2	285	67	27	24	2	8	8	lb. oz. dr.	1	—	Dec.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
		"	496	5 10	5 14	20	21	21	21	22	24	14	17	17	17	24	20	18	166	67	2	285	67	27	24	2	8	8	lb. oz. dr.	1	—	Aug., June																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
		4/3/35	497	5 10	5 9	21	17	—	—	18	22	21	22	22	23	15	7	109	42	—	—	212	41	22	27	1	5	5	oz.	—	—	Dec.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
		"	498	4 8	6 15	19	21	21	21	22	24	14	17	17	17	24	20	18	166	67	2	285	67	27	24	2	8	8	lb. oz. dr.	—	—	June																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
†	Capt. H. M. S. Redmond Popetield, Athy, Laoighis.	12/3/35	337	4 12	5 15	19	7	10	—	21	22	20	26	20	20	9	8	12	20	89	45	164	4	16	41	2	1	2	(a) 1,004	—	1	Jan., July																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
		21/2/35	338	4 8	6 0	18	15	18	18	19	20	15	12	16	12	16	19	13	176	2	—	177	32	19	9	2	7	7	lb. oz. dr.	—	4	July, June																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
		25/3/35	339	4 8	6 6	23	24	22	22	23	24	16	13	13	17	16	13	17	193	130	95	234	10	24	101	2	0	0	lb. oz. dr.	—	2	Oct. Aug.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
		12/3/35	340	4 9	D	1	7	4	10	10	21	21	21	21	21	20	11	14	193	130	95	234	10	24	101	2	0	0	lb. oz. dr.	1	—	Oct. Aug.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
		"	341	4 9	D	1	7	4	10	10	21	21	21	21	21	20	11	14	193	130	95	234	10	24	101	2	0	0	lb. oz. dr.	—	—	June																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
		"	342	4 8	4 8	23	24	23	21	21	22	16	11	11	11	14	8	75	126	—	—	212	07	25	11	2	2	2	(d) 25 12 0	—	0	—	—																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
†	Rev. Bro. Dominick, Agricultural College, Mount Bellay, Co. Galway.	March 35	313	6 4	0 12	—	7	21	10	19	18	20	23	21	20	10	17	196	2	—	198	32	21	61	2	4	7	(a) 980	—	—	Oct., Aug.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
		"	314	4 15	5 6	18	17	16	11	14	11	14	11	12	13	6	13	132	32	—	194	67	19	41	2	4	4	lb. oz. dr.	—	—	Aug., June																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
		"	315	4 15	4 12	—	17	20	20	21	14	11	12	11	12	18	—	16	118	76	—	193	42	21	11	2	4	(b) 139 11 0	—	—	Oct., July																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
		"	316	4 15	5 8	10	25	25	23	23	25	25	26	16	9	13	11	226	5	—	231	67	27	2	9	7	7	oz.	—	3	July																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
		"	317	4 18	D	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	27 4	—	—	Oct., Aug.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
		"	318	4 15	5 8	—	—	18	22	21	21	26	22	17	17	17	13	4	110	80	104	18	19	11	2	0	0	(d) 25 9 11	—	2	July																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
†	Mrs. E. M. Dennehy, Stradally, Laoighis.	21/2/35	307	4 11	5 10	13	—	8	12	18	15	14	12	—	9	11	12	12	78	34	124	6	11	81	2	0	0	(a) 933	1	7	Oct., July																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
		"	308	5 7	6 10	14	—	6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	lb. oz. dr.	—	—	Nov.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
		"	309	5 0	5 12	24	23	19	19	22	21	22	21	22	22	35	29	146	73	3	23	221	75	29	31	2	4	(b) 130 13 8	—	1	Oct., July																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
		"	310	4 14	6 3	27	18	21	18	20	25	25	25	25	25	33	20	161	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267	84	267

SECTION III.—RHODE ISLAND RED—(continued).

Order of Merit	NAME AND ADDRESS OF OWNER	Date of Hatching	Weight		EGGS LAID												EGGS PER PULLEY				Value per Pullet	Average Weight of Eggs per Pullet	Total Eggs from Pen.				Number of times Broody	Date of Moulting (Neck moults in italics)		
			On arrival of first lb. oz.	At close of year lb. oz.	Oct. 31	Nov. 30	Dec. 27-Jan. 23	Jan. 24-Feb. 20	Feb. 21-Mar. 19	Mar. 20-Apr. 16	Apr. 17-May 14	May 15-June 11	June 12-July 9	July 10-Aug. 6	Aug. 7-Sep. 3	Special Grade	First Grade	Second Grade	Total	First Grade Oct. 4-Jan. 3			(a) Total weight from Pen.	(b) Total weight per dozen.	(c) Av. weight per dozen.	(d) Total value from Pen.				
†	Miss M. Cunningham, Foxhall, Aylesbury, Youghal, Co. Cork.	Feb. '85	301	4 8	5 12	—	15	20	19	16	18	21	25	22	20	21	20	35	178	7	220	80	24	(a) 965 lb. oz. dr.	(b) 127 1 5 oz.	(c) 25.3 4 10	1	1	Oct., July	
		"	302	4 8	5 10	—	18	10	16	10	15	17	19	15	13	15	13	59	95	7	149	31	16	(a) 965 lb. oz. dr.	(b) 127 1 5 oz.	(c) 25.3 4 10	1	1	Oct., July	
		Mar. '85	303	4 8	5 8	—	2	21	19	20	7	22	16	14	14	11	10	59	50	5	109	43	16	(a) 965 lb. oz. dr.	(b) 127 1 5 oz.	(c) 25.3 4 10	1	1	Oct., Aug.	
		"	304	4 8	5 8	—	15	25	6	23	8	23	16	19	10	10	13	83	63	2	103	41	17	(a) 965 lb. oz. dr.	(b) 127 1 5 oz.	(c) 25.3 4 10	1	1	Oct., Aug.	
		"	306	4 8	5 0	9	1	22	24	22	25	19	20	19	10	10	13	31	163	1	194	1	18	(a) 965 lb. oz. dr.	(b) 127 1 5 oz.	(c) 25.3 4 10	4	1	Oct., July	
†	Mrs. O. L. Cardew, Castelfort, Thurles, Co. Tipperary.	21/2/85	319	5 8	6 13	21	21	20	17	16	17	20	12	15	7	13	10	8	108	189	8	20	04	(a) 955 lb. oz. dr.	(b) 121 15 0 oz.	(c) 24.5	—	—	Aug., June	
		"	320	5 0	6 14	—	—	—	—	—	—	—	—	—	—	—	—	—	10	101	26	101	—	5	(a) 955 lb. oz. dr.	(b) 121 15 0 oz.	(c) 24.5	—	—	Oct., June
		"	322	4 10	5 14	7	21	11	10	25	19	16	15	15	12	16	0	10	161	2	172	38	13	(a) 955 lb. oz. dr.	(b) 121 15 0 oz.	(c) 24.5	—	—	Nov., June	
		"	323	5 2	5 13	19	13	19	21	18	10	22	12	8	8	12	16	15	161	15	151	52	22	(a) 955 lb. oz. dr.	(b) 121 15 0 oz.	(c) 24.5	—	—	Oct., July	
		"	324	4 8	5 2	17	23	23	16	21	21	14	13	12	7	9	35	147	20	202	55	23	(a) 955 lb. oz. dr.	(b) 121 15 0 oz.	(c) 24.5	—	—	June, June		
*†	Miss S. M. Cooke, Aske Gorey, Co. Wexford.	Mar. '85	259	4 8	5 12	11	22	7	—	3	22	25	23	17	16	—	—	14	123	9	146	37	15	(a) 909 lb. oz. dr.	(b) 123 4 9 oz.	(c) 24.4	—	—	Dec., July	
		"	260	4 13	4 13	9	1	22	24	21	21	24	26	24	10	—	—	43	144	4	191	35	20	(a) 909 lb. oz. dr.	(b) 123 4 9 oz.	(c) 24.4	—	—	Oct., Aug.	
		"	261	4 8	4 9	6	—	—	—	—	—	—	—	—	—	—	—	1	46	75	122	1	9	(a) 909 lb. oz. dr.	(b) 123 4 9 oz.	(c) 24.4	—	—	Oct., July	
		"	262	5 12	5 4	23	9	—	9	24	7	26	17	13	14	13	21	139	106	29	17	1	(a) 909 lb. oz. dr.	(b) 123 4 9 oz.	(c) 24.4	—	—	Dec., July		
		"	264	4 13	5 10	7	—	—	—	—	—	—	—	—	—	—	—	2	113	23	171	46	20	(a) 909 lb. oz. dr.	(b) 123 4 9 oz.	(c) 24.4	—	—	Oct., July	
*†	Mrs. S. K. Harris Ballingaddy, Kilmallock, Co. Limerick.	26/2/85	290	4 14	5 6	12	1	14	19	10	18	13	11	10	13	12	12	—	72	78	150	7	14	(a) 943 lb. oz. dr.	(b) 120 15 0 oz.	(c) 24.6	—	—	Nov., June	
		"	291	5 4	5 10	8	—	21	19	19	19	22	25	22	23	24	10	—	105	105	175	21	20	(a) 943 lb. oz. dr.	(b) 120 15 0 oz.	(c) 24.6	—	—	Oct., Aug.	
		"	292	5 0	5 12	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	(a) 943 lb. oz. dr.	(b) 120 15 0 oz.	(c) 24.6	—	—	Oct., July	
		"	293	5 0	5 13	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	(a) 943 lb. oz. dr.	(b) 120 15 0 oz.	(c) 24.6	—	—	Jan., July	
		"	294	4 14	5 9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	(a) 943 lb. oz. dr.	(b) 120 15 0 oz.	(c) 24.6	—	—	Oct., Aug.	
†	Mrs. B. M. Raffler, Knockthomas, Inver, Co. Carlow.	7/8/85	481	4 10	5 10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	(a) 829 lb. oz. dr.	(b) 114 10 8 oz.	(c) 20.0	—	—	Oct., Feb.	
		"	482	4 15	5 2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	(a) 829 lb. oz. dr.	(b) 114 10 8 oz.	(c) 20.0	—	—	Oct., June	
		"	483	4 8	5 11	12	18	15	16	17	19	21	22	22	13	13	18	8	172	14	16	14	16	(a) 829 lb. oz. dr.	(b) 114 10 8 oz.	(c) 20.0	—	—	Oct., July	
		"	484	4 11	6 12	7	19	16	16	10	13	10	20	13	12	10	8	8	3	172	46	19	14	16	(a) 829 lb. oz. dr.	(b) 114 10 8 oz.	(c) 20.0	—	—	Oct., July
		"	486	4 8	5 13	12	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	(a) 829 lb. oz. dr.	(b) 114 10 8 oz.	(c) 20.0	—	—	Oct., June	

SECTION III.—RHODE ISLAND RED—(continued).

Order of Merit	Number of Pen	NAME AND ADDRESS OF OWNER	Date of Hatching	No. of Pullet	WEIGHT		EGGS LAID												EGGS PER PULLET				Value per Pullet	Average Weight of Eggs per Pullet	Eggs under Prescribed Weight				Number of times Broody	Date of Moulting (Neck incuts in italics)	
					On rival of Test	At close of Test	Oct. 4-Oct. 31	Nov. 1-Nov. 28	Nov. 29-Dec. 26	Dec. 27-Jan. 23	Jan. 24-Feb. 20	Feb. 21-Mar. 19	Mar. 20-Apr. 16	Apr. 17-May 14	May 15-June 11	June 12-July 9	July 10-Aug. 6	Aug. 7-Sep. 3	Special Grade	First Grade	Second Grade	Total			First Grade Oct. 4-Jan. 3	(a) Total Eggs from Pen.	(b) Total weight of dozen.	(c) Av. weight per dozen.			(d) Total value from Pen.
†	63	Mrs. E. M. Dennehy, Ballyvaughne, Stradally, Laoighis.	31/1/35 " " 21/2/35 31/7/85	487	6 5	6 9	17	8	—	—	—	—	6	18	17	17	21	21	25	39	5	64	—	5 9 ¹ / ₂	12 2 ¹ / ₂	(a) 811	(b) 115	—	—	—	July, June
				488	5 2	6 12	15	—	—	—	22	25	17	20	15	11	12	109	66	53	—	124	15	13 2 ¹ / ₂	11 11 ¹ / ₂	(c) 115	(d) 115	—	—	—	Oct., July, Nov., June
				489	6 14	6 12	15	—	13	21	22	15	14	13	11	12	109	66	53	—	115	15	11 11 ¹ / ₂	2 3	(e) 115	(f) 115	—	—	—	Dec., July	
				490	5 11	6 8	17	9	—	19	16	14	17	21	18	13	13	15	173	148	4	147	26	14 10	2 3	(g) 27.3	(h) 24	7 7 ¹ / ₂	—	—	—
†	64		31/7/85	491	5 0	6 10	—	17	19	16	14	17	22	18	12	148	148	1	167	41	19	4	2 3	5 5	(i) 27.3	(j) 24	7 7 ¹ / ₂	—	—	—	
				492	4 15	6 11	—	17	20	20	20	17	22	19	13	13	16	118	118	1	197	41	19	4	2 3	5 5	(k) 27.3	(l) 24	7 7 ¹ / ₂	—	—

D—Dead.

† Disqualified under Clause 23 (pen produced less than 1,020 eggs)

SECTION IV.—RHODE ISLAND RED (STATION HOLDERS)—22 PENS.

Order of Merit	Number of Pen	NAME AND ADDRESS OF OWNER	Date of Hatching	WEIGHT		EGGS LAID										EGGS PER PULLET				Value per Pullet.	Average Weight of Eggs per Pullet.	(a) Total Eggs from Pen.				Bugs under Prescribed	Number of times Broody	Date of Moulting (Week months in italics)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
				No. of Pullet	On trial lb. oz.	At close of Test lb. oz.	Oct. 4-Oct. 31	Nov. 1-Nov. 28	Nov. 29-Dec. 28	Dec. 27-Jan. 23	Jan. 24-Feb. 20	Feb. 21-Mar. 19	Mar. 20-Apr. 16	Apr. 17-May 14	May 15-June 11	June 12-July 9	July 10-Aug. 6	Aug. 7-Sep. 3	Special Grade			First Grade	Second Grade	Total	First Grade Oct. 4-Jan. 3																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
1	81	Mrs. H. Bruce, Hill Brook, Blyth, Offaly.	22/2/85	445	4 12	5 4	24	17	24	23	18	13	17	20	20	19	13	10	10	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	

SECTION IV.—RHODE ISLAND RED (STATION HOLDERS)—(continued).

Order of Merit	Number of Pen	NAME AND ADDRESS OF OWNER	Date of Hatching	WEIGHT		EGGS LAID										EGGS PER PULLET				Value per Pullet				Average Weight of Eggs per Pullet				Total Eggs from Pen.				Eggs under Prescribed Weight	Number of times Broody	Date of moulting (Noted in Italics)																																																																																																																																																																																																																																																																																																																																																							
				On trial	At close of Test	Oct. 4-Oct. 31	Nov. 1-Nov. 28	Nov. 29-Dec. 26	Dec. 27-Jan. 23	Jan. 24-Feb. 20	Feb. 21-Mar. 19	Mar. 20-Apr. 16	Apr. 17-May 14	May 15-June 11	June 12-July 9	July 10-Aug. 6	Aug. 7-Sep. 3	Special Grade	First Grade	Second Grade	Total	First Grade	Oct. 4-Jan. 3	Total	Value per Pullet	Average Weight of Eggs per Pullet	(a) Total Eggs from Pen.	(b) Total weight lb. oz. dr.	(c) Av. weight per dozen.	(d) Total value from Pen.																																																																																																																																																																																																																																																																																																																																																											
10	70	Miss J. Rowe, Moylaw Poultry Farm, Crossmolina, Co. Mayo.	1/2/35 " " " "	379 380 381 382 383 384	4 8 4 14 4 9 4 10 4 8 4 10	4 15 D 5 4 D D	21 22 23 24 25 26	22 23 24 25 26 27	23 24 25 26 27 28	24 25 26 27 28 29	25 26 27 28 29 30	26 27 28 29 30 31	27 28 29 30 31 1	28 29 30 31 1 2	29 30 31 1 2 3	30 31 1 2 3 4	31 32 33 34 35 36	32 33 34 35 36 37	33 34 35 36 37 38	34 35 36 37 38 39	35 36 37 38 39 40	36 37 38 39 40 41	37 38 39 40 41 42	38 39 40 41 42 43	39 40 41 42 43 44	40 41 42 43 44 45	41 42 43 44 45 46	42 43 44 45 46 47	43 44 45 46 47 48	44 45 46 47 48 49	45 46 47 48 49 50	46 47 48 49 50 51	47 48 49 50 51 52	48 49 50 51 52 53	49 50 51 52 53 54	50 51 52 53 54 55	51 52 53 54 55 56	52 53 54 55 56 57	53 54 55 56 57 58	54 55 56 57 58 59	55 56 57 58 59 60	56 57 58 59 60 61	57 58 59 60 61 62	58 59 60 61 62 63	59 60 61 62 63 64	60 61 62 63 64 65	61 62 63 64 65 66	62 63 64 65 66 67	63 64 65 66 67 68	64 65 66 67 68 69	65 66 67 68 69 70	66 67 68 69 70 71	67 68 69 70 71 72	68 69 70 71 72 73	69 70 71 72 73 74	70 71 72 73 74 75	71 72 73 74 75 76	72 73 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D—Dead.

SECTION IV.—RHODE ISLAND RED (STATION HOLDERS)—continued.

Order of Merit	Number of Pen	NAME AND ADDRESS OF OWNER	Date of Hatching	No. of Pullets	WEIGHT		EGGS LAID												EGGS PER PULLET				Value per Pullet	Average Weight of Eggs per Pullet	(a) Total Eggs from Pen. (b) Total weight per dozen. (c) Total value from Pen.	Days under Prescribed Weight	Number of times Broody	Date of Moulting (Week moulting in italics)			
					On arrival of Test lb. oz. lb. oz.	At close of Test lb. oz. lb. oz.	Oct. 4-Oct. 31	Nov. 1-Nov. 28	Nov. 29-Dec. 28	Dec. 29-Jan. 28	Jan. 24-Feb. 20	Feb. 21-Mar. 19	Mar. 20-Apr. 16	Apr. 17-May 14	May 15-June 11	June 12-July 9	July 10-Aug. 6	Aug. 7-Sep. 3	Special Grade	First Grade	Second Grade	Total							Oct. 4-Jan. 3		
																						Total								1st Grade	2nd Grade
† 84	463	Mrs. M. Smith, Kildoon, Dunboyne, Co. Meath.	15/3/35	463	5 4	0 8	18	18	11	9	12	16	14	11	11	9	11	20	108	24	147	28	1 10 1/2	(a) 1,018 lb. oz. dr.	—	—	3	Dec., Aug.			
17/2/35			464	5 4	5 0	23	19	19	19	19	19	19	19	19	19	19	19	31	123	10	133	—	1 10 1/2	(b) 134 6 1	—	—	6	June			
"			465	4 8	5 0	23	19	19	19	19	19	19	19	19	19	19	19	19	15	132	10	132	—	2 2 3/4	(c) 25.3	—	—	Oct., Jan., July, June			
15/3/35			466	4 8	D	20	23	21	17	14	16	20	17	16	15	10	11	11	77	80	5	162	65	2 2 3/4	(d) £5 12 11	—	—	—	July, June		
15	467	Mr. P. Meegan, Drummoreagh, Caberford, Co. Monaghan.	7/8/35	467	5 3	0 6	—	—	11	23	23	26	25	24	20	12	—	149	28	2	179	16	18 10 1/2	(a) 1,103 lb. oz. dr.	—	—	—	Nov., July, Oct., July			
"			468	5 0	5 15	—	—	—	—	—	—	—	—	—	—	—	—	69	140	1	210	4	20 10	(b) 151 3 7	—	—	—	Nov., July, Oct., July			
"			469	5 4	6 7	22	8	22	21	21	21	21	21	21	21	21	21	100	177	4	177	2	23 18 1/2	(c) 26.3	—	—	—	Jan., Aug., July			
"			467	5 0	4 8	11	15	11	4	—	—	—	—	—	—	—	—	—	142	40	192	23	13 13 1/2	(d) £5 12 0 1/2	—	—	—	Nov., July, Oct., July			
*† 82	451	Mrs. M. Cruite, Tulla, Three Castles, Co. Kilkenny.	Feb. 35	451	4 14	5 1	24	21	22	20	19	20	17	25	10	14	16	7	39	169	7	215	71	95 4 1/2	(a) 978 lb. oz. dr.	—	—	3	June, Aug.		
"			452	4 8	4 14	22	20	16	10	6	19	24	19	8	15	9	8	2	20	155	7	177	24	7 9 11	(b) 126 11 5	—	—	4	June, Aug.		
"			453	5 4	5 12	17	7	—	—	—	—	8	17	7	6	—	—	12	91	3	5	94	7	24 9 11	(c) 24.9	—	—	—	June, Aug.		
"			454	4 8	4 8	20	19	20	19	19	19	19	19	19	19	19	19	19	22	121	45	188	46	21 6	(d) £5 11 9	—	—	—	July, June, Aug.		
† 75	409	Mrs. A. R. Ferguson, Cleckley, Co. Sligo.	21/3/35	409	4 9	0 0	10	20	2	—	4	24	15	18	15	14	17	10	73	83	2	158	40	17 0 1/2	(a) 971 lb. oz. dr.	—	—	4	Dec., July		
"			410	4 12	6 13	3	25	16	16	16	16	16	16	16	16	16	16	19	139	—	239	15	15 12 6 1/2	(b) 135 1 12	—	—	—	Oct., June			
"			411	4 12	5 14	20	20	21	20	20	20	20	20	20	20	20	20	20	118	118	5	174	65	18 10 1/2	(c) 24.7	—	—	—	June		
"			412	4 8	5 10	18	12	15	11	16	13	19	20	16	—	—	—	—	65	79	1	159	18	16 10 1/2	(d) £5 8 4 1/2	—	—	—	Oct., July		
† 80	499	Miss T. Harvey, Northfield House, Connolly, Ennis, Co. Clare.	1/3/35	499	4 13	D	14	21	20	19	15	19	23	21	20	4	—	—	160	15	1	176	60	20 10 1/2	(a) 898 lb. oz. dr.	—	—	—	Oct., July		
"			500	4 12	5 10	6	19	21	22	19	22	21	21	21	9	D	—	75	10	—	143	50	16 10 1/2	(b) 122 10 6	—	—	—	Jan., June			
"			501	4 12	5 10	12	21	22	21	22	21	21	21	21	14	16	15	74	17	12	221	61	25 11 1/2	(c) 26.2	—	—	3	Oct., June			
"			502	4 8	5 10	—	—	—	—	—	—	—	—	—	—	—	—	—	84	19	103	89	17	2 2 3/4	(d) £5 0 9	—	—	—	July, June		

* Disqualified under Clause 28 (more than 20 per cent. second grade eggs). † Disqualified under Clause 28 (pen produced less than 1,020 eggs).

D = Dead.

SECTION IV.—RHODE ISLAND RED (STATION HOLDERS) — (continued).

Order of Merit	Number of Pen	NAME AND ADDRESS OF OWNER	Date of Hatching	WEIGHT		EGGS LAID												EGGS PER PULLET				Value per Pullet		Average Weight of Eggs per Pullet	(a) Total Eggs from Pen.				Eggs under Prescribed Weight	Number of times Broody	Date of Moulting (Neck months in italics)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
				No. of Pullet	On Ar- rival of Test	At close of Test	Oct. 4-Oct. 31	Nov. 1-Nov. 28	Nov. 29-Dec. 26	Dec. 27-Jan. 23	Jan. 24-Feb. 20	Feb. 21-Mar. 19	Mar. 20-Apr. 16	Apr. 17-May 14	May 15-June 11	June 12-July 9	July 10-Aug. 6	Aug. 7-Sep. 3	Special Grade	First Grade	Second Grade	Total	First Grade		Oct. 4-Jan. 3	(a) 816 lb. oz. dr.	(b) 108 6 5	(c) 25.5 oz.				(d) 24 15 0	(a) 801	(b) 121 5 11	(c) 27.1	(d) 24 8 84	1	1	1	2	Oct. Jan. 4 to June																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
71		Mrs. M. Cummins, Talloher, New Ross, Co. Kilkenny.	23/3/35	385 386 387 388 389 390	4 13 4 14 5 0 5 8 5 8 4 14	5 14 D 6 8 6 15 D	— 18 18 13 14 23	18 23 24 24 24	18 23 24 24 24	18 23 24 24 24	18 23 24 24 24	18 23 24 24 24	18 23 24 24 24	18 23 24 24 24	21 21 21 21 21	12 12 12 12 12	9 9 9 9 9	22 22 22 22 22	120 120 120 120 120	89 89 87 86 81 9	2 2 3 3 3 3	211 211 211 211 211 211	10 16 11 10 16 11 10 16 11 10 16 11 10 16 11 10 16 11	(a) 816 lb. oz. dr.	(b) 108 6 5	(c) 25.5	(d) 24 15 0	1	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	

D = Dead. † Disqualified under Clause 25 (pen produced less than 1,020 eggs). U.T. = Untrapped.

SECTION V.—ANY NON-SITTING BREED.—12 PENS.

[illegible]

* Disqualified under Clause 28 (more than 20 per cent, second grade eggs

SECTION V.—ANY NON-SITTING BREED—(continued).

Order of Merit	NAME AND ADDRESS OF OWNER	Date of Hatching	No. of Pullet	WEIGHT		EGGS LAID										EGGS PER PULLET				Value per Pullet	Average Weight of Eggs per Pullet	(a) Total Eggs from Pen.				Breed of Himes	Date of Moulting (Neck moults in italics)	
				On rival	At close of Test	Oct. 1-Oct. 31	Nov. 1-Nov. 28	Nov. 29-Dec. 28	Dec. 29-Jan. 28	Jan. 29-Feb. 28	Feb. 29-Mar. 19	Mar. 20-Apr. 10	Apr. 17-May 14	May 15-June 11	June 12-July 9	July 10-Aug. 6	Aug. 7-Sep. 3	Special Grade	First Grade			Second Grade	Total	First Grade	Second Grade			Third Grade	Total	First Grade	Second Grade	Third Grade	Total	(a) Total Eggs from Pen.	(b) Total weight per dozen.	(c) Total value from Pen.
5	White Leghorn. Miss P. Alley, Hill Poultry Farm, Abboy, Co. Meath.	8/4/85	565	4 2	4 8	16 21	5 14	2	2	23	9	22	26	23	21	17	82	111	69	11	194	13	11	13	Oct.			
		"	566	4 1	4 8	16 21	5 14	2	2	23	9	22	26	23	21	17	82	111	69	11	194	13	11	13	Oct.			
		"	567	4 13	4 8	16 21	5 14	2	2	23	9	22	26	23	21	17	82	111	69	11	194	13	11	13	Oct.			
		"	568	3 11	4 3	16 17	18 19	6	9	23	26	24	25	22	21	17	82	111	69	11	194	13	11	13	Oct.			
		"	569	3 8	4 2	16 17	18 19	6	9	23	26	24	25	22	21	17	82	111	69	11	194	13	11	13	Oct.			
6	White Leghorn. Miss E. M. O'Connell, St. Rita's P. Sem., Lake Vale, Ballydesmond, Co. Cork.	25/9/85	520	3 12	4 11	18 7	12 6	14	18	21	22	23	24	23	21	18	181	15	170	47	227	30	23	64	Nov., Aug.			
		"	521	3 12	4 11	18 7	12 6	14	18	21	22	23	24	23	21	18	181	15	170	47	227	30	23	64	Nov., Aug.			
		"	522	4 10	4 10	15 19	8 13	1	14	16	20	20	19	13	10	15	72	85	15	—	227	69	26	81	Nov., July			
		"	523	3 8	3 7	10 1	4	—	1	11	18	10	8	21	11	17	189	12	57	28	96	14	8	91	Nov., Aug.			
		"	524	4 2	4 11	7 6	12 6	14	18	21	22	23	24	23	21	18	181	15	170	47	227	30	23	64	Nov., Aug.			
* 91	White Leghorn. Miss J. Gould, Co. Wick, Milford, Beltinnet, Co. Cavan.	March '35	523	3 9	4 8	25 21	22 21	21	21	20	23	23	24	20	25	18	67	1	67	196	294	7	25	64	July			
		"	524	3 13	4 2	21 21	21 21	21 21	21 21	21 21	21 21	21 21	21 21	21 21	21 21	21 21	21 21	67	141	6	214	63	24	6	July			
		"	525	4 0	4 12	20 18	18 13	5	16	17	21	22	25	12	D	16	39	92	80	13	204	50	22	31	Nov., July			
		"	526	4 1	4 12	20 18	18 13	5	16	17	21	22	25	12	D	16	39	92	80	13	204	50	22	31	Nov., July			
		"	527	4 0	4 12	20 18	18 13	5	16	17	21	22	25	12	D	16	39	92	80	13	204	50	22	31	Nov., July			
7	White Leghorn. Mrs. K. Lysaght, Hazelwood, Co. Cork.	20/3/85	505	3 8	3 6	11 6	12 20	20	19	24	21	24	21	24	21	18	—	53	136	7	196	28	20	101	Nov., Aug.			
		"	506	3 14	4 12	14 20	5 19	16	19	24	21	24	21	24	21	18	—	53	136	7	196	28	20	101	Nov., Aug.			
		"	507	3 15	4 14	9 11	11 6	23	24	26	24	24	24	24	24	23	22	198	88	3	219	41	23	8	Nov., Aug.			
		"	508	3 10	D	14 19	19 17	—	22	19	24	23	21	22	21	D	—	174	1	13	14	1	1	12	Nov., Aug.			
		"	509	3 14	D	14 19	19 17	—	22	19	24	23	21	22	21	D	—	174	1	13	14	1	1	12	Nov., Aug.			
† 94	White Leghorn. Mrs. L. Burke, Santry Hall, Co. Dublin.	11/3/85	541	3 13	4 1	—	—	—	11	19	21	23	20	24	23	22	3	16	131	25	172	—	15	101	Oct., Aug.			
		"	542	4 0	5 7	—	—	—	18	17	18	24	24	26	23	21	19	39	164	6	209	23	21	81	Oct., Aug.			
		"	543	4 3	4 10	14 24	22 19	17	22	24	24	24	24	24	24	23	21	18	127	107	240	23	21	81	Oct., Aug.			
		20/3/85	544	4 0	5 2	19 12	8	—	18	23	24	24	24	24	24	23	20	47	82	2	228	18	23	04	Oct., Aug.			
		"	545	4 0	5 2	11	—	—	18	23	24	24	24	24	24	23	20	47	82	2	228	18	23	04	Oct., Aug.			

* Disqualified under Clause 28 (more than 20 per cent. second grade eggs). † Disqualified under Clause 28 (pen produced less than 1,020 eggs).

D = Dead.

SECTION VI.—ANY OTHER GENERAL PURPOSE BREED—18 PENS.

Order of Merit	Number of Pen	NAME AND ADDRESS OF OWNER	Date of Hatching	WEIGHT		EGGS LAID										EGGS PER PULLET		Average Weight of Eggs per Pullet	(a) Total Eggs from Pen. (b) Total weight per dozen. (c) Av. weight per dozen. (d) Total value from Pen.				Eggs under Prescribed Weight	Number of Hens	Date of Moulting (Neck moult, in italics)
				On lb. oz. lb. oz.	At close of Test rival lb. oz. lb. oz.	Oct. 4-Oct. 31	Nov. 1-Nov. 30	Nov. 29-Dec. 28	Dec. 27-Jan. 25	Jan. 24-Feb. 20	Feb. 21-Mar. 19	Mar. 20-Apr. 16	Apr. 17-May 14	May 15-June 11	June 12-July 9	July 10-Aug. 6	Aug. 7-Sep. 3								
1	106	Light Sussex, Bookfield, Ballymore, Co. Kildare.	14/3/85	709	5 13	0 0	19 22	12 19	16 19	16 19	16 19	15 16	15 16	15 16	15 16	15 16	15 16	15 16	15 16	15 16	15 16	15 16	15 16	15 16	15 16
			"	710	5 13	0 0	21 24	22 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23
			"	711	6 9	7 4	19 20	19 20	19 20	19 20	19 20	19 20	19 20	19 20	19 20	19 20	19 20	19 20	19 20	19 20	19 20	19 20	19 20	19 20	19 20
			"	712	5 12	7 4	19 20	19 20	19 20	19 20	19 20	19 20	19 20	19 20	19 20	19 20	19 20	19 20	19 20	19 20	19 20	19 20	19 20	19 20	19 20
			"	713	5 9	6 10	11 21	20 19	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18
2	103	Light Sussex, Miss D. M. Place, Rosemount, New Ross, Co. Wexford.	15/3/85	595	5 8	0 0	17 19	21 15	18 19	18 19	18 19	18 19	18 19	18 19	18 19	18 19	18 19	18 19	18 19	18 19	18 19	18 19	18 19	18 19	18 19
			"	596	5 8	0 0	6 7	21 19	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22
			"	597	5 9	0 0	24 24	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23
			"	598	5 9	0 14	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22
			10/2/85 17/3/85	599	5 8	0 10	21 21	21 21	21 21	21 21	21 21	21 21	21 21	21 21	21 21	21 21	21 21	21 21	21 21	21 21	21 21	21 21	21 21	21 21	21 21
3	116	Buff Rock, Mrs. E. Naughton, Slattamore, Roskealy, Drogheda, Co. Roscommon.	9/1/85	673	5 0	D	19 20	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22
			"	674	5 0	6 15	18 20	21 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18
			"	675	5 0	7 0	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22
			"	676	5 4	6 11	25 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23
			"	677	5 6	0 11	23 25	25 19	25 19	25 19	25 19	25 19	25 19	25 19	25 19	25 19	25 19	25 19	25 19	25 19	25 19	25 19	25 19	25 19	25 19
4	102	Buff Rock, Slader, Technical School, Stradbally, Laois.	21/1/85	577	5 0	7 4	15 16	19 18	20 19	20 19	20 19	20 19	20 19	20 19	20 19	20 19	20 19	20 19	20 19	20 19	20 19	20 19	20 19	20 19	20 19
			"	578	5 0	6 6	15 16	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18
			24/2/85	579	5 0	6 6	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18	18 18
			"	580	5 3	5 4	20 23	22 24	24 24	24 24	24 24	24 24	24 24	24 24	24 24	24 24	24 24	24 24	24 24	24 24	24 24	24 24	24 24	24 24	24 24
			"	581	5 2	5 9	18 25	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22	22 22
5	113	Light Sussex, Mrs. E. Percival, Tullymore, Ballymore, Co. Sligo.	17/2/85	655	5 10	0 12	9 13	17 21	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23	23 23
			"	656	5 10	0 12	22 25	24 19	19 19	19 19	19 19	19 19	19 19	19 19	19 19	19 19	19 19	19 19	19 19	19 19	19 19	19 19	19 19	19 19	19 19
			"	657	5 10	0 12	22 25	24 19	19 19	19 19	19 19	19 19	19 19	19 19	19 19	19 19	19 19	19 19	19 19	19 19	19 19	19 19	19 19	19 19	19 19
			"	658	5 12	7 0	22 24	17 18	19 20	17 18	17 18	17 18	17 18	17 18	17 18	17 18	17 18	17 18	17 18	17 18	17 18	17 18	17 18	17 18	17 18
			2/3/85	659	5 8	0 13	22 24	17 18	19 20	17 18	17 18	17 18	17 18	17 18	17 18	17 18	17 18	17 18	17 18	17 18	17 18	17 18	17 18	17 18	17 18

D = Dead

SECTION VI.—ANY OTHER GENERAL PURPOSE BREED—(continued).

Order of Merit	NAME AND ADDRESS OF OWNER	Date of Hatching	No. of Pullet	WEIGHT		EGGS LAID												EGGS PER PULLET				Value per Pullet		(a) Total weight from Pen. (b) Total weight per dozen. (c) Av. weight from Pen. (d) Total value from Pen.				Number of times Broody	Date of Moulting (Neck moult in italics)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
				On Arival	At close of Test	Oct. 4-Oct. 31	Nov. 1-Nov. 30	Nov. 23-Dec. 20	Dec. 27-Jan. 23	Jan. 24-Feb. 20	Feb. 21-Mar. 10	Mar. 20-Apr. 10	Apr. 17-May 14	May 15-June 11	June 12-July 9	July 10-Aug. 6	Aug. 7-Sep. 3	Special Grade	First Grade	Second Grade	Total	First Grade Oct. 4-Jan. 3	Average Weight of Pullet																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.

* Disqualified under Clause 28 (more than 20 per cent. second grade eggs).

† Disqualified under Clause 28 (pen produced less than 1,020 eggs).

D = Dead.

SECTION VI.—ANY OTHER GENERAL PURPOSE BREED—(continued).

Order of Merit	NAME AND ADDRESS OF OWNER	Date of Hatching	No. of Pullet	WEIGHT		EGGS LAID												EGGS PER PULLET				Value per Pullet	Average Weight of Eggs per Pullet	(a) Total Eggs* from Pen.				Bills under Prescribed Weight	Number of times Broody	Date of Moulting (Neck moult in italics)
				On arrival lb. oz.	At close of Test lb. oz.	Oct. 4-Oct. 31	Nov. 1-Nov. 23	Nov. 24-Dec. 26	Dec. 27-Jan. 23	Jan. 24-Feb. 20	Feb. 21-Mar. 19	Mar. 20-Apr. 16	Apr. 17-May 14	May 15-June 11	June 12-July 9	July 10-Aug. 6	Aug. 7-Sep. 3	Special Grade	First Grade	Second Grade	Total			First Grade Oct. 4-Jan. 3	Second Grade	Third Grade	Total				(b) Total weight per dozen.	(c) Av. weight per dozen.	(d) Total value from Pen
7	Barrett Rock, Mrs. E. A. Henderson, Ardruim, Imiscarra, Co. Cork.	1/3/85	625	5 3	4 14	4	—	—	9	15	16	21	24	22	13	19	7	18	126	6	150	3	14	31	2	2	1	Nov., June, Oct.		
		5/2/85	626	5 13	6 5	8	—	—	—	—	5	19	20	19	17	11	15	17	91	0	114	8	10	31	2	2	—	Nov., Jan., Aug.		
		1/3/85	627	5 2	6 6	16	19	16	15	15	13	16	17	11	6	—	—	32	103	9	144	50	15	4	2	1	—	July, June		
		6/8/85	628	6 3	6 10	13	1	23	8	—	14	22	23	24	22	20	—	34	164	18	194	38	19	11	2	—	Nov., Jan., Aug.			
		13/2/85	630	6 0	7 5	18	24	23	21	23	25	25	21	23	19	12	6	137	164	4	200	54	22	0	1	—	July, June			
8	Light Sussex, Miss P. Alley, Hill Poultry Farm, Athboy, Co. Meath.	15/2/85	679	5 8	5 10	9	3	—	19	22	24	19	20	10	12	24	5	3	85	79	167	11	15	11	1	15	1	Oct., July		
		"	680	5 14	D	21	22	18	17	21	23	23	24	12	11	90	10	3	83	126	240	40	27	2	4	—	Oct., July			
		8/3/85	682	5 10	6 0	21	24	18	17	21	23	23	24	20	24	19	5	150	58	2	210	60	22	6	2	—	Oct., Aug.			
		26/2/85	683	5 8	6 0	22	21	17	11	7	60	21	22	21	22	15	17	10	137	58	205	27	20	10	2	0	—	Oct., Aug., July		
		"	684	5 12	6 4	—	—	22	24	21	20	21	22	21	22	15	17	10	137	58	205	27	20	10	2	0	—	—		
104	Buff Rock, Miss M. Walsh, Tullamore, Co. Kerry.	2/2/85	601	5 8	6 0	20	19	16	—	3	17	22	19	15	12	15	8	78	86	1	165	54	18	4	2	3	—	Oct., July		
		"	602	5 1	4 9	3	19	21	18	18	10	23	10	15	11	7	11	142	38	86	180	49	21	0	1	4	Oct., July			
		"	603	5 0	6 4	—	—	18	23	20	24	21	20	20	20	15	—	24	146	86	206	54	22	10	2	2	Oct., June			
		"	604	5 9	5 15	—	—	3	18	20	18	19	18	6	6	—	—	112	10	—	122	8	12	9	2	6	Oct., June			
		"	605	5 6	5 10	18	14	5	15	11	15	12	14	3	13	14	9	99	43	1	148	42	16	10	2	4	—	Oct., July		
† 110	Buff Rock, Mrs. E. Kennedy, Ballyroe, Freshford, Co. Kilkenny.	1/2/85	637	5 4	D	12	25	24	18	16	7	11	—	—	—	—	—	82	36	—	118	67	16	6	4	—	Oct., June			
		"	638	5 12	6 12	17	19	17	17	15	23	20	25	23	4	16	—	162	99	—	171	58	20	3	6	—	June			
		"	639	5 6	5 7	17	14	D	18	10	15	11	6	7	—	—	—	9	13	5	27	22	3	8	1	15	—	—		
		"	640	5 2	D	21	6	D	18	10	15	11	6	7	—	—	—	93	35	—	128	60	16	5	2	4	—	July, June		
		"	642	5 7	5 8	18	17	22	22	21	20	20	23	20	17	12	14	155	71	—	226	63	25	11	4	—	—	—		
*† 101	Buff Rock, Mrs. M. Trench, P. M. Hill, New Ross, Co. Wexford.	1/2/85	583	5 0	4 9	12	21	22	19	21	21	22	18	6	12	8	3	1	4	180	185	5	18	5	1	13	—	July, June		
		16/2/85	584	5 4	5 10	13	17	19	20	11	18	25	25	20	22	20	20	1	121	108	230	18	23	24	2	4	—	Oct., June		
		23/2/85	585	5 4	D	18	16	17	19	19	17	20	20	16	10	—	—	66	21	190	89	32	4	2	0	4	—	—		
		1/2/85	587	5 0	4 11	21	19	16	15	14	20	22	22	16	12	25	12	97	150	97	132	44	15	8	1	6	—	—		
		2/3/85	588	5 0	D	—	—	4	21	20	20	17	20	—	—	—	—	—	53	20	84	61	9	2	1	4	—	July		

D = Dead. * Disqualified under Clause 28 (more than 20 per cent. second grade eggs).

† Disqualified under Clause 28 (pen produced less than 1,020 eggs).

SECTION VI.—ANY OTHER GENERAL PURPOSE BREED — (continued).

Order of Merit	Number of P. n	NAME AND ADDRESS OF OWNER	Date of Hatching	No. of Pullets	WEIGHT		EGGS LAID												EGGS PER PULLET		Value per Pullet	Average Weight of Eggs per Pullet	(a) Total Eggs from Pen.				Eggs under Prescribed Weight	Number of Lines	Date of Mounting (Week months in italics)
					On rival of Test	At close of Test	Oct. 1-Oct. 31	Nov. 1-Nov. 30	Nov. 29-Dec. 28	Dec. 27-Jan. 25	Jan. 24-Feb. 20	Feb. 21-Mar. 16	Mar. 20-Apr. 16	Apr. 17-May 14	May 15-June 11	June 12-July 9	July 10-Aug. 6	Aug. 7-Sep. 3	Special Grade	First Grade	Second Grade	Total	First Grade	Oct. 4-Jan. 3	(a) Total Eggs from Pen.	(b) Total weight per dozen.	(c) Av. weight from Pen.		
† 118		Barred Rock. Mr. J. S. Henderson, Ardur, Inverclyde, Co. Cork.	1/3/35	685	5 8	6 4	17	13	—	—	—	3 11	13 21	18 21	18 19	18 19	18 21	21 20	130	2	—	132	8	—	(a) 680	oz. dr.	—	—	Jan. Feb., Aug., Oct.
			5/2/35	686	5 12	6 8	—	—	—	—	3 11	13 21	18 21	18 19	18 19	18 21	21 20	21 20	130	2	—	132	8	—	(b) 127 13 0	—	—	1	—
			12/3/35	687	5 12	6 8	—	—	—	—	3 11	13 21	18 21	18 19	18 19	18 21	21 20	21 20	130	2	—	132	8	—	(c) 26.4	—	—	—	—
			1/3/35	688	6 6	7 11	—	—	—	—	4 8	22 23	23 24	23 24	23 24	23 24	23 24	23 24	125	82	78	162	8	—	(d) 25.1	—	—	—	Oct., Jan., July
			15/2/35	689	5 13	7	16	13	14	14	7	21 22	23 24	23 24	23 24	23 24	23 24	23 24	125	91	82	218	38	—	(e) 25.1	—	—	—	Oct., July
*† 111		Barred Rock. Miss B. Power, Shieverue, Bultinstown, Co. Waterford.	11/2/35	643	5 5	7 5	5	—	—	—	7 14	18 25	25 26	25 26	25 26	25 26	25 26	25 26	124	46	41	89	6	—	(a) 601	oz. dr.	—	—	Oct., June
			"	644	5 1	6 1	—	—	—	—	7 14	18 25	25 26	25 26	25 26	25 26	25 26	25 26	124	50	33	177	10	—	(b) 117 9 15	—	—	—	Oct., Feb., June
			"	645	5 0	5 0	—	—	—	—	7 14	18 25	25 26	25 26	25 26	25 26	25 26	25 26	124	33	11	93	16	—	(c) 25.1	—	—	—	Oct., Jan., July
			"	646	5 0	5 11	13	5	11	24	14	25 26	26 27	26 27	26 27	26 27	26 27	26 27	—	83	128	214	—	—	(d) 25.1	—	—	—	—
			"	647	5 0	4 8	10	7	11	—	13 22	23 24	23 24	23 24	23 24	23 24	23 24	23 24	—	5	119	124	—	—	(e) 25.1	—	—	—	—
105		Barred Rock. Sister-in-Charge, R.D.E. School, Swinford, Co. Mayo.	28/2/35	607	5 6	6 5	20	18	19	14	16	21	21	21	21	21	21	21	162	41	1	204	42	—	(a) 811	oz. dr.	—	—	July
			5/2/35	608	5 4	6 3	14	20	17	12	11	16	17	17	17	17	17	17	11	117	52	170	25	—	(b) 101 6 12	—	—	—	Oct., July
			"	609	5 15	6 11	—	—	—	—	—	16	17	17	17	17	17	17	—	98	32	141	27	—	(c) 87.0	—	—	—	June
			28/2/35	610	5 0	5 15	16	23	18	17	—	21 24	25 26	25 26	25 26	25 26	25 26	25 26	13	121	77	211	26	—	(d) 24.0	—	—	—	Jan.
			5/2/35	612	5 5	6 2	4	—	8	11	11	18	18	18	18	18	18	18	4	149	18	171	10	—	(e) 24.0	—	—	—	Oct., June

* Disqualified under Clause 28 (more than 20 per cent. second grade eggs). † Disqualified under Clause 28 (even produced less than 1,020 eggs).

D = Dead.

NOTES AND MEMORANDA

Sixth World's Poultry Congress, 1936.

The Sixth World's Poultry Congress was held at Leipzig, Germany, from July 24th to July 31st, 1936, and was attended by delegates representing forty-two countries. Mr. D. Philpott, B.Agr.Sc., M.Sc., Department of Agriculture, attended as delegate from Saorstát Éireann.

The Congress, which was under the vice-presidency of Professor Alessandro Ghigi, Italy, was formally opened by Mr. R. Walther-Darré, National Minister for Food and Agriculture.

The programme of the Scientific Session at the Congress was divided into seven sections, namely:—

1. General Reports.
2. General, Instruction, Organisation.
3. Physiology of the Egg, Physiology and Feeding of Poultry.
4. Hatching, Rearing, Breeding and Heredity.
5. Hygiene and Disease.
6. Questions of Economics.
7. Rabbit Breeding.

About 160 papers were presented in all sections.

An International Poultry and Rabbit Show was organised in connection with the Congress, seventeen countries exhibiting domestic fowl, and, in some cases, water-fowl, turkeys, pigeons or rabbits. Eighteen countries staged National Exhibitions.

Excursions to educational and research institutions and to poultry farms were organised in connection with the Congress, and, on the conclusion of the Congress, a number of members took part in a tour of Germany, during which further farms and institutions were visited.

Official banquets to the National Delegates of the countries participating in the Congress were given by the National Minister for Food and Agriculture and by the Mayor of Leipzig.

Annual Congress of the National Veterinary Medical Association, 1936.

The Department was represented by its Chief Veterinary Officer, Mr. J. H. Norris, M.R.C.V.S., at the fifty-fourth Annual Congress of the Veterinary Medical Association, which was held in Scarborough from the 14th to the 18th September, 1936, under the presidency of Captain J. R. Barker, M.R.C.V.S., D.V.H., of Hereford.

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In accordance with the usual practice, the proceedings of the Congress were divided into three sections as follows :

- (a) Veterinary Medicine and Surgery ;
- (b) Experimental Pathology ;
- (c) Public Health.

The subjects presented for discussion included : (1) A general consideration of the diseased conditions mentioned in the Horse Breeding Acts ; (2) Hysteria in dogs ; (3) Some observations on the use of vaccines in the protection of cattle against tuberculosis ; (4) Abortion in ewes ; (5) The detection of the tuberculous udder ; (6) The administration of the Accredited Producers' Scheme of the Milk Marketing Board ; (7) An address and demonstration by Professor Nils Lagerlöf of Stockholm on sterility in bulls ; (8) Operations and demonstrations in equine surgery, poultry diseases, euthanasia. Professor T. G. Browne of the Veterinary College, Dublin, gave demonstrations on Local Anæsthesia (Nerve-blocking) for dehorning of cattle, and Spinal (Epidural) Anæsthesia in the horse and cow.

The members were given a civic reception on the first evening of the Congress, which was officially opened by the Mayor of Scarborough. The attendance at the Congress was exceptionally large, and included a number of Veterinary Surgeons from Saorstát Éireann.

Commonwealth Scientific Conference, 1936.

At the Commonwealth Scientific Conference held in Great Britain in September–October, 1936, under the chairmanship of Sir Charles J. Howell Thomas, K.C.B., K.C.M.G., Saorstát Éireann was represented by a delegation consisting of the Secretary and Agricultural Director of the Department of Agriculture (Mr. D. Twomey and Mr. J. M. Adams) and the Secretary of the Office of the High Commissioner in London (Mr. C. J. O'Donovan). The following were also represented at the Conference :

Great Britain, Canada, Australia, New Zealand, South Africa, Newfoundland, India, Southern Rhodesia and the British Colonies, Protectorates and Mandated Territories.

In addition to general questions of scientific collaboration, the subjects for discussion at the Conference included the finances and administration of the existing Imperial Agricultural Bureaux, the Imperial Mycological Institute and the Imperial Institute of Entomology ; the desirability of establishing new Bureaux to deal with dairying and forestry, and the future financing of certain research activities (*e.g.* the transport and storage of

foodstuffs) towards which, at the date of the Conference, contributions were being made by certain governments.

The Conference was opened in London on the 21st September, 1936, by the Right Hon. Walter Elliott, M.P., M.C., F.R.S., and on the following day the delegates set out, as guests of the British Government, on a tour of research centres in Great Britain. At Cambridge the Plant Breeding Institute, the Imperial Bureau of Plant Genetics (Non-Herbage) and the Low Temperature Research Station were visited, after which the delegates proceeded to the Wool Research Station at Torridon, near Leeds. From this point the Conference divided into two groups, one of which travelled north to Edinburgh and Aberdeen, returning through Aberystwyth and Oxford, while the other visited centres within easy reach of London, joining the northern group at Oxford before returning to London for the main discussions of the Conference. In the course of their tours, delegates were entertained by civic and university authorities in the various centres visited.

Sugar Beets as Feed for Live Stock.

The importance of the sugar beet as a source of feed for live stock is being seriously investigated in Germany. The crop of leaves and tops alone is estimated at about eight tons per acre, the equivalent of an average meadow. If no sugar is produced, but only high-grade beet slices, the farmer obtains—in addition to the tops and leaves—a feeding product the nutritive value of which is about the same as that of barley. Whether it would pay him to turn out feed slices as well as sugar would depend upon the price which the former could command.

If a suitable price for feeding slices could be arrived at, it is thought that the area under sugar beet might be easily increased, and if beet products were substituted for imported barley in the feeding of pigs, a saving of about 30 million R.M. in foreign exchange would be effected. The difficulties attendant on the change-over are, of course, recognised; drying-plant would have to be erected, and the farmer would have to be induced to adopt the new feeding-stuff. Nevertheless, it is believed that, if all obstacles can be overcome, the increased growing of beet would benefit the land, besides giving employment to the families of many of the smaller farmers.

Experiments in Denmark have shown that sugar beets are an excellent feed for cattle, horses and pigs, and that the dry matter in sugar beet is, in some cases, more valuable to milch cows than the dry matter in mangels. The growing interest among farmers in raising sugar beet for feeding purposes is shown by the fact that, while ten years ago the growing of sugar beet as feeding stuff was almost unknown in Denmark, the area planted for this purpose in 1934 amounted to 15,750 acres, and in 1935 to 20,250 acres. It is expected that there will be a further increase in this figure in the present season.

The Warble Campaign in Germany.

The annual loss in meat, milk and damage to hides caused by the warble pest in Germany is estimated at something like eight millions sterling. Since the coming into force of the Warble Fly Act of 1934, good progress has been made in controlling the pest. Of the two methods—the mechanical and the chemical—the latter is most generally used, as the work of washing the animals can be entrusted to almost anyone. The method of extracting the larvæ by means of a small hook is, however, greatly in favour in Bavaria, where 108,116 larvæ were extracted last year from 12,515 animals, and the total number of warbles in seven badly-affected districts is said to have been reduced by over 47½ per cent.

In Austria, too, good results have been obtained by the extraction method, which is popular owing to its cheapness. In the province of Tyrol the number of warbles is said to have fallen by about 80 per cent. in the past three years.

It is pointed out that the good results obtained in both Germany and Austria are due to the careful and conscientious carrying out of the work of warble extermination, whether by means of chemical washes or by the extraction of the larvæ.

The Danish Dairying Industry.

In 1934 the number of milch cows kept in Denmark was 1,717,000. The average annual milk-yield per cow was 704 gallons, and the total quantity of milk produced was 1,208 million gallons. Of this quantity 80 per cent. was used for butter-making, 3 per cent. for cheese-making, 0.5 per cent. for making condensed milk and milk powder, 7 per cent. for use on the farm, and 9.5 per cent. for consumption as fresh milk in the towns.

There are in Denmark 206,000 agricultural holdings, of which 189,000 or 92 per cent. are connected with a co-operative creamery. The number of co-operative creameries is now about 1,400.

With the development of the dairy industry, that of pig-breeding and bacon-curing also developed. The 60 co-operative abattoirs handle over 80 per cent. of the bacon and pig products exported. The amount of bacon exported in 1934 was 219,348 tons.

Milk Recording in Sweden, 1934-35.

According to the latest report issued, the milk recording movement in Sweden is progressing satisfactorily. The number of recorded herds at the close of the year 1934-35 was 19,183, comprising 318,042 cows. This is an increase of 1,177 herds and 13,611 cows, as compared with the previous year. The average number of herds to each recorder was 21, and the average number of cows 320, during the year under review.

The extension of the movement to farms of a smaller size is shown in the fact that eleven was the average number of cows on the farms whose owners joined during the past year. The average number of cows for all recorded herds fell from 16.9 in 1934 to 16.5 in 1935. The number of recorded cows is now about 16.4 per cent. of the total number of cows in Sweden. The percentage of recorded cows varies from 35 in some provinces to 1.6 in others.

The average amount of concentrated feed used showed a slight increase—namely, from 611 food units per cow for 1933-34 to 673 for 1934-35.

The average milk-yield per cow for the whole country amounted to 3587 kilos or about 789 gallons, which was an increase of about 10 gallons on the previous year. The average fat content of the milk fell, however, to 3.64 per cent., from 3.65 in 1933-34.

Fishy Flavour in Butter : Swedish Experiments.

An investigation has been made at the Swedish State Experimental Station into the influence of certain green foods upon the flavour of butter. During the period August-October, 1934, two or three equal groups, each consisting of 15 Friesian cows with high milk-yield, were housed and fed on rations consisting of green fodder in various combinations with other foodstuffs, such as crushed grain, sugar beet pulp, hay and straw. In August and the first half of September the green fodder consisted of lucerne; in the latter half of September and October, of young clover, and in late October, of sugar beet tops.

The inquiry showed that excessive feeding with young clover, lucerne and sugar beet tops in fresh condition tended to produce butter with a fishy flavour. Young clover and young lucerne had a more pronounced effect than more mature lucerne and sugar beet tops. The risk of fishy-flavoured butter can be minimised or eliminated if the fresh foodstuffs mentioned are supplemented by other foods to a sufficient degree. In the trials dried beet pulp (25 to 30 per cent. sugar), crushed grain, hay and straw were used.

When young clover was fed as the main food, the salt ration at the experimental farm (35 grammes per day per animal) was omitted for ten days, but had no effect upon the tendency of the milk to produce fishy butter. When cows were allowed to graze on lucerne, the fishy flavour appeared with equal frequency, whether the milk-yield was large or small.

The effect of pasteurizing the cream at suitable temperatures was found to counteract largely fishiness in the butter. The question of how these results may best be applied to practical dairying is still under consideration.

Control of Bovine Tuberculosis in Denmark.

In the course of a lecture delivered before the Royal Danish Agricultural Society, Veterinary Director Gerhard Petersen gave an account of the campaign against bovine tuberculosis in Denmark. This campaign dates from the last quarter of the nineteenth century. Very little was known as to the prevalence of the disease before 1890 or thereabouts, when the use of tuberculin as a means of diagnosis became known. There are grounds for supposing that the disease spread in Denmark in the early nineties owing, largely, to the importation of foreign cattle.

As a result of an inquiry made in 1886, Professor Bang stated that clinical examination showed the average percentage of tuberculous cattle to be from 4 to 5 per cent., and on large farms, from 7 to 8½ per cent., while in certain districts the percentage was as high as 25. According to a report made in 1882, over 31 per cent. of cows belonging to smallholders were tuberculous.

The problem was much debated towards the close of the nineteenth century, when several congresses were held. The control methods of Bang and Ostertag were tested on a more or less extensive scale in the years which followed. In recent times, the danger to human beings has been more clearly realised, and many towns have demanded tubercle-free milk.

The number of herds tested with government help was 934 in 1920, 1,676 in 1922, and 2,511 in 1923. An outbreak of foot and mouth disease interrupted the work for some years, but in 1928 the number of herds tested rose to over 3,000. The number fell again to 2,058 herds in 1930, but the official figure no longer indicates the full extent of public interest in the campaign. Apart from the government tests, many private persons had their herds tested during the period 1927-30, and many creameries organised the testing of their suppliers' herds.

The number of animals subjected to test during the winter of 1928-29 was 189,246, or one-fifteenth of the total number of cattle in Denmark. In 1934 the proportion of animals tested was one-twelfth of the total, and the number of tuberculin tests had greatly increased. In that year, the State provided free, or partly-aided, tests in 13,379 herds, and supplied free tuberculin to about 23,000 other herds.

The campaign against bovine tuberculosis has been helped by the meat inspection service, and the scheme for destroying uneconomic cows. Both these activities have effected the elimination of a certain number of tuberculous animals.

In reply to the question as to whether the best method had been adopted in the Danish campaign and what line should be followed in the future, Dr. Petersen said that Bang's method (the one adopted) is the best. It was devised in the 'nineties, and in thousands of cases has proved efficacious in freeing herds from infection and keeping them free.

The early hopes of a speedy eradication of bovine tuberculosis have, unfortunately, not been realised. The disease, at least, seems to be at a standstill, and, thanks to further discoveries and to the energetic steps now being taken, there is a good prospect of seeing it driven back a good deal farther during the next few years.

Land Reclamation in Denmark.

An interesting feature of the Exhibition held last year at Grindsted, in S.W. Jutland, is the Pavilion of the Danish Heath Society. The contents of this Pavilion illustrate the wonderful development of the surrounding country, thanks to the Society's efforts in the planting of forests and the improvement of partially productive land.

In 1866, the village of Grindsted stood in a waste of desolate moorland, treeless, and practically unproductive, save as grazing for sheep and cattle. To-day, it is a flourishing town, the centre of a network of roads and railways,

and surrounded with fertile fields and pleasant woods. One district, in particular, that known as Slaugs Herred, is a remarkable instance of what has been accomplished. Before the Heath Society began their operations, 65 per cent. of this district was heath or moorland, 5 per cent. was marsh and common, and 3.7 per cent. was turf bog. A certain amount of corn was grown and a few potatoes, but the land in general was given over to the grazing of sheep and cattle. The district was, in fact, known as one of the poorest in Denmark. To-day the proportion under woods and plantations amounts to 16.3 per cent., the area under marsh and heather is just one-half of what it was in 1866, and the area under crops and pasture has more than doubled. The population of the district is now nearly four times what it was in 1866. The number of sheep is less than 10 per cent. of what it used to be, but cattle have increased from 3,446 head in 1866 to 15,893 in 1936, and the number of pigs has increased from 510 to 11,604.

Danish Poultry Research.

The Danish State Laboratory for Poultry Research has issued a report on the work done in 1934-35. The number of pens tested was 51, of which 44 completed the year with at least 7 birds. If two birds from a pen die, figures are not published, but (if the owner desires) the remaining birds may complete the test.

Of the 408 hens sent in for test, 28 died during the year. When a bird dies of tuberculosis, the pen to which it belonged is sent home, and the house and run thoroughly disinfected. Every hen which has, during the test period, laid 200 eggs of an average weight of 57 grammes, is provided with a special ring bearing her number and the number of eggs laid. Records are kept of

the amount of grain and free food consumed monthly by each pen. The grain ration consists of 4 parts wheat, 3 parts oats, and 3 parts maize. Of this mixture each pen received 20 grammes per bird, scattered every morning. In addition, birds may eat as much grain as they wish for a restricted period in the afternoon, from 2 to 6 o'clock in winter and from 4.30 to 6 o'clock in summer. They have also free access all day to the following food ration : 20 parts of yellow maize, 20 of wheat straw meal, 15 of wheat bran, 15 of meat-bone meal, 6 of crushed soya, 5 of fish meal, 2 of dried yeast, $1\frac{1}{2}$ of chalk, $\frac{1}{2}$ of salt and 10 of lucerne meal.

The records kept now include particulars of the colour and shape of each hen's eggs. The colour is determined by a scale of ten shades, grading from pure white to dark "Barneveld" brown. The index figures used to express the shape of an egg are obtained by ascertaining its length and breadth with the help of a special pair of calipers. The index of shape is the breadth expressed as a percentage of the length. A table is provided on which the shape index can be read off when the length and breadth are known. For example : when an egg measures 60mm. in length and 44 in breadth, its shape index will be 73. A really well-shaped egg has an index of about 75 ; a round, short egg may have one of 80, and a long narrow egg one of 55

During the five years' work at the Laboratory the average figures per bird for number and weight of eggs were as follows :—

	No. of eggs in 11 months		Weight of Eggs Grammes		Calculated to 12 months
1930-31	.. 167	..	.. 57.4	..	.. 182
1931-32	.. 181	..	.. 57.9	..	.. 197
1932-33	.. 189	..	.. 59.4	..	.. 206
1933-34	.. 185	..	.. 60.5	..	.. 215

The birds tested in 1934-35 were divided into two groups : light and heavy. The light group included the Leghorns and Anconas ; the heavy group the Wyandottes, Rhode Islands, Sussex and Plymouth Rocks. The average figures for all pens were as follows :—

	No. of Pens	No. of Eggs	Total Weight of Eggs. Kg.	Weight of each Egg. Gr.	Weight of Food per Kg. of Eggs.
Light Group	32	201	12.24	60.9	3.17
Heavy Group	12	185	11.05	59.8	3.68

Official Stud-Book for Danish Cocks.

After two years' study of progenies at the State Farm, Faurholm, near Hillerød, Denmark, an Official Stud-Book of Cocks has been compiled. The

first volume contains portraits and a number of important particulars about the 9 cocks which are all that have obtained admission to its pages, so far. As it is calculated that from 15 to 20 cocks will be added each year, the book will probably be published annually.

Poultry breeders who desire to have their cocks registered must apply, before 1st June, to the Secretary of the State Poultry Committee. Cocks are tested, provided proof of good breeding-work is given, and the owner is willing to submit to a certain amount of supervision. As a rule, however, cocks are selected at the local judgments for the Whole Flocks Competition held annually.

The owner of every cock which is selected for trial must hand over eight of the cock's daughters to be used for public record work at Faurholm, and it will largely depend on the productive powers of these daughters whether their sire can be accepted for registration or not.

The committee advise all poultry-breeders who desire fresh blood to apply to the owners of registered cocks with a view to buying cockerels descended in the direct line from the registered bird which appears to be most suitable to their needs.

Entries in the Stud-Book give the name of the cock, breed, name and address of owner, and egg-production of the cock's daughters.

The Evils of Egg-Washing : Circular to Danish Producers.

In a circular dated 16th April, 1936, and sent to all egg-producers, the Danish Ministry of Agriculture point out that the sale of washed eggs in Denmark is prohibited by law unless such eggs are expressly described as second-grade, and that the exportation of washed eggs is absolutely forbidden.

The reason for these enactments lies in the fact that washing removes, entirely or partially, the natural protective covering which prevents the penetration of infectious germs through the shell. Washing, therefore, reduces the egg's powers of resistance and keeping-quality, with the result that it tends to spoil during transit and in the cold store. As many Danish eggs are exported for cold storage, the Ministry urges very earnestly the absolute discontinuance of the practice of washing, which, if persisted in, will do great harm to the Danish egg trade.

The circular adds that washing, even when it leaves no visible traces, can be revealed chemically, and instructions have been issued to the Government services to see that the above-mentioned regulations are duly observed.

In connection with the Government circular, the Danish Egg Export Committee have issued a statement in which they point out that competition in the egg trade is growing steadily more intense, as the number of exporting countries increases while that of importing countries declines. It is impossible to improve the quality of eggs above the limit fixed by nature, but one can, and must, avoid spoiling these perishable things by careless or injurious methods of handling, *e.g.*, by first allowing the egg to become soiled and then cleaning it more or less roughly. The committee point out that some producers still labour under the delusion that eggs can be cleaned with a cloth dipped in vinegar or vinegar and water, or with the help of scouring powders. Experiments have shown that this treatment is even more injurious than other forms of cleansing.

The committee stress the importance of frequent changes of nest material and frequent collection as means of avoiding the soiling of eggs.

Owing to the fact that many Danish eggs have to be exported nowadays to very distant places, and that a considerable part of the spring crop has to be put into cold store, or otherwise preserved for autumn and winter use, it is more than ever essential that the keeping-quality of the eggs shall be irreproachable.

Fourth International Grassland Congress, 1937.

It is learned that the Fourth International Grassland Congress will be held in Great Britain in July, 1937, under the presidency of Professor R. G. Stapledon, C.B.E., M.A., Director of the Welsh Plant Breeding Station and of the Imperial Bureau for Herbage Plants, Aberystwyth, Wales. The previous Congresses in the series were held in Europe, and membership consisted almost entirely of European delegates. The organisers anticipate, however, that the fourth Congress will be attended by delegates from the U.S.A., Great Britain, the British Dominions and Colonies and numerous other countries members of the International Grassland Congress Association, which has its central office in Leipzig.

The paper reading sessions in Aberystwyth from the 13th to the 19th July, 1937, will deal with the following aspects of the grassland problem :

Ecology; pasture and range management; seeds mixtures (including lucerne for grazing); legumes for use in poor pastures; plant breeding, genetics and seed production; manures and fertilisers; nutritive value of pastures; fodder conservation; grassland economics.

Participants will have the option of joining in tours of centres of grassland interest, including selected farms and research institutions, both before and after these sessions. The tours are designed to afford members an

opportunity of seeing something of British grassland farming, including livestock management, over as wide a range as possible.

Copies of the preliminary programme, which indicates the approximate cost per head of the various tours, may be obtained on application to the Joint Secretaries of the Congress, Agricultural Buildings, Aberystwyth, Great Britain. The fee for membership of the Congress is £2.

INDEX—VOLUME XXXIV.

Agriculture , Meeting of the International Commission of, 1935	213
Albert Agricultural College, Glasnevin, 1935, Tomato Variety Trial at the	124
Annual Congress of the National Veterinary Medical Association, 1935	208
Annual Congress of the National Veterinary Medical Association, 1936	398
Beef Scheme, Danish	215
Bog Land, Seed Potatoes from	48
Botanical Conference, 1935, Third Imperial	209
— Congress, 1935, Sixth International	210
Bovine Tuberculosis in Denmark, Control of	402
British Sugar Beet Industry : Ten Years' Work	219
Butter, Fishy Flavour in : Swedish Experiments	402
— Production in Denmark, 1933	216
— Testing Station, The Saorstát	308
Caffrey, M. , and Carroll, P. T., Vernalization, Its Principles and Practice	53
Calf, Mineral Metabolism in the, and the addition of Inorganic Minerals to the Calf's Diet	1
Carroll, J., M.Sc., D.I.C., A.R.C.S.C.I., N.D.A. The Raspberry Beetle (Byturus tomentosus) and its Control	119
Carroll, P. T., and Caffrey, M., Vernalization, its Principles and Practice	53
Cocks, Danish, Official Stud-Book for	405
Commission of Agriculture, 1935, Meeting of the International	213
Conference, Commonwealth Scientific, 1936	399
— 1935, Fourth Imperial Entomological	211
— 1935, Third Imperial Botanical	209
Congress of Entomology, 1935, Sixth International	210
— 1937, Fourth International Grassland	406
— of the National Veterinary Medical Association, 1935	208
— of the National Veterinary Medical Association, 1936	398

	PAGE
Congress, 1935, Sixth International Botanical	210
— Sixth World's Poultry	398
— of Soil Science, 1935, Third International	208
Control of Bovine Tuberculosis in Denmark	402
Cow-Testing in Denmark, 1933-34	221
Crown Rot in Sugar Beet	131
Dairying Industry, the Danish	401
Danish Beef Scheme	215
— Cocks, Official Stud-Book for	405
— Dairying Industry, The	40
— Pig-Killings, 1931-35	219
— Poultry Research	404
— Producers, Circular to : The Evils of Egg-Washing	405
Davidson, W. D., B.A., B.Sc. The History of the Potato and its Progress in Ireland	286
— W. D., B.A., B.Sc. Seed Potatoes from Bog Land	48
Deasy, D., B.AGR.SC., and Drew, Professor, J. P., M.Sc., A.R.C.S.C.I. An Investigation into the Intensive System of Grassland Management	225
Denmark, Butter Production in, 1933	216
— Control of Bovine Tuberculosis in	402
— Cow-Testing in, 1933-34	221
— Land Reclamation in	403
— Prevalence of Warble Fly in	216
Donegal, The Herring Fisheries off the North Coast of	262
Drew, Professor J. P., M.Sc., A.R.C.S.C.I., and Deasy, D., B.AGR.SC. An Investigation into the Intensive System of Grassland Management	225
Effects of Tar on the Germination of Wheat Seed, The	63
Egg-Laying Competition, 1934-35, Report on the National	137
— Competition, 1935-36, Report on the National	327
Egg Washing, The Evils of : Circular to Danish Producers	405
Entomological Conference, 1935, Fourth Imperial	211

	PAGE
Entomology, 1935, Sixth International Congress of ...	210
Evils of Egg-Washing, The : Circular to Danish Producers ...	405
Experiments, Field, 1935 ...	73
Export Premiums in Finland ...	214
Farran, G. P., B.A. The Herring Fisheries off the North Coast of Donegal ...	262
Field Experiments, 1935 ...	73
Final Fruit Crop Report, 1935 ...	86
————— 1936 ...	312
inland, Export Premiums in ...	214
isheries off the North Coast of Donegal, The Herring ...	262
Fishy Flavour in Butter : Swedish Experiments ...	402
Flax and Hemp in Germany, Growing ...	219
Fourth Imperial Entomological Conference, 1935 ...	211
Fourth International Grassland Congress, 1937 ...	406
France, Scheme for Eliminating Tuberculous Cattle in ...	221
Fruit Crop Report, 1935, Final ...	86
————— 1936, Final ...	312
German Poultry Industry, State-Aid for the ...	215
Germany, Growing Flax and Hemp in ...	219
— The Warble Campaign in ...	400
Germination of Wheat Seed, The Effects of Tar on the ...	63
Grassland Congress, Fourth International, 1937 ...	406
Grassland Management, An Investigation into the Intensive System of ...	225
Growing Flax and Hemp in Germany ...	219
Hemp, Growing Flax and, in Germany ...	219
Herdbooks and Milk Recording, International Standardizing of ...	214
Herring Fisheries off the North Coast of Donegal, The ...	262
History of the Potato and its Progress in Ireland, The ...	286
Horse, The Irish ...	271

	PAGE
Imperial Botanical Conference, 1935, Third	209
— Entomological Conference, 1935, Fourth	211
Intensive System of Grassland Management, an Investigation into the	225
International Botanical Congress, 1935, Sixth	210
— Commission of Agriculture, 1935, Meeting of the	213
— Congress of Entomology, 1935, Sixth	210
— Congress of Rural Engineering, 1935, Second	213
— Grassland Congress, 1937, Fourth	406
— Standardizing of Herdbooks and Milk Recording	214
Investigation into the Intensive System of Grassland Management, An	225
Irish Horse, The	271
Lafferty, H. A., F.R.C.S.C.I. The Effects of Tar on the Germination of Wheat Seed	63
Land Reclamation in Denmark	403
Live Stock, Sugar Beets as Feed for	400
Machine-Milking v. Hand-Milking	217
Meeting of the International Commission of Agriculture, 1935	213
Milk Recording, International Standardizing of Herdbooks and	214
Milk Recording in Sweden, 1934-35	401
Milking, Machine- v. Hand-Milking	217
Mineral Metabolism in the Calf and the Addition of Inorganic Minerals to the Calf's Diet	1
Netherlands Production of Potato By-Products, 1933-34	217
Notes and Memoranda	208
Notes and Memoranda	398
Official Document	223
Official Stud-Book for Danish Cocks	405
Pig Killings, Danish, 1931-35	219
Potato By-Products, Netherlands Production of, 1933-34	217

	PAGE
Exhibit at the Royal Horticultural Society's Show, London, Seed	212
History of the, and its Progress in Ireland	286
Production in the Northern Hemisphere	213
toes, Seed, from Bog Land	48
oultry Congress, Sixth World's	398
Industry, German, State-Aid, for the	215
Research, Danish	404
valence of Warble Fly in Denmark	216
Berry Beetle (<i>Byturus tomentosus</i>) and its Control, The ...	119
amation, Land, in Denmark	403
Report on the National Egg-Laying Competition, 1934-35 ...	137
1935-36 ...	327
Report of the Seed Propagation Division, 1934	33
1935	100
1936	248
Royal Horticultural Society's Show, London, Seed Potato Exhibit at the	212
Rural Engineering, 1935, Second International Congress of ...	213
Saorstat Butter Testing Station, The	308
Scheme for Eliminating Tuberculous Cattle in France	221
Scientific Conference, 1936, Commonwealth	399
Second International Congress of Rural Engineering, 1935 ...	213
Seed Potatoes from Bog Land	48
— Potato Exhibit at the Royal Horticultural Society's Show, London	212
— Propagation Division, Report of the, 1934	33
— Propagation Division, Report of the, 1935	100
— Propagation Division, Report of the, 1936	248
Senior, B. J., M.Sc., and Sheehy, E. J., F.R.C.S.C.I., B.Sc., Mineral Metabolism in the Calf and the Addition of Inorganic Minerals to the Calf's Diet	1

Sheehy, E. J., F.R.C.S.C.I., B.Sc., and Senior, B. J., M.Sc. Mineral Metabolism in the Calf and the Addition of Inorganic Minerals to the Calf's Diet	...	...	...	...	...	...
Sherrard, G. O., A.R.C.S.C.I., and Usher, J. Tomato Variety Trial at the Albert Agricultural College, Glasnevin, 1935	...	...	...	...	...	12
Sixth International Botanical Congress, 1935	...	...	...	...	...	210
Sixth International Congress of Entomology, 1935	...	...	...	...	...	210
Sixth World's Poultry Congress	...	...	...	...	...	398
Skim-Milk as Food, the Use of	...	...	...	...	...	218
Soil Science, 1935, Third International Congress of	...	...	...	...	...	20
State-Aid for the German Poultry Industry	...	...	...	...	...	2
Stud-Book, Official, for Danish Cocks	...	...	...	...	...	4
Sugar Beet Industry, British: Ten Years' Work	...	...	...	...	...	218
Sugar Beets as Feed for Live Stock	...	...	...	...	...	400
Sweden, Milk Recording in, 1934-35	...	...	...	...	...	401
Swedish Experiments: Fishy Flavour in Butter	...	...	...	...	...	402
Tar , The Effects of, on the Germination of Wheat Seed	...	...	...	...	...	6
Third Imperial Botanical Conference, 1935	...	...	...	...	...	20
— International Congress of Soil Science, 1935	...	...	...	...	...	20
Tomato Variety Trial at the Albert Agricultural College, Glasnevin, 1935	...	...	...	...	...	124
Tuberculosis, Bovine, Control of, in Denmark	...	...	...	...	...	401
Tuberculous Cattle in France, Scheme for Eliminating	...	...	...	...	...	221
Use of Skim-Milk as Food, The	...	...	...	...	...	218
Usher, J., and Sherrard, G. O., A.R.C.S.C.I. Tomato Variety Trial at the Albert Agricultural College, Glasnevin, 1935	...	...	...	...	...	12
Vernalization , its Principles and Practice	...	...	...	...	...	53
Veterinary Medical Association, 1935, Congress of the National	...	...	...	...	...	208
— 1936, Congress of the National	...	...	...	...	...	390
Warble Campaign in Germany, The	...	...	...	...	...	400
Warble Fly in Denmark, Prevalence of	...	...	...	...	...	216
— Fly Experiments, 1935	133
Wheat Seed, The Effects of Tar on the Germination of	6

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